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MONTEREY, CALIFORNIA

THESIS

MODELING CONFLICT BETWEEN CHINA AND THE UNITED STATES

by

Phil W. Reynolds

December 2012

Thesis Advisor:	William P. Fox
Second Reader:	Brian Greenshields

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REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704–0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202–4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704–0188) Washington, DC 20503.

1. AGENCY USE ONLY *(Leave blank)*	**2. REPORT DATE** December 2012	**3. REPORT TYPE AND DATES COVERED** Master's Thesis

4. TITLE AND SUBTITLE
MODELING CONFLICT BETWEEN CHINA AND THE UNITED STATES

5. FUNDING NUMBERS

6. AUTHOR(S) Phil W. Reynolds

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Naval Postgraduate School
Monterey, CA 93943–5000

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES)
N/A

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPP.LEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government. IRB Protocol number ____N/A____.

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for public release; distribution is unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT (maximum 200 words)

As the United States exits Iraq and Afghanistan, it must begin the long process of preparing for future challenges. There is considerable pressure on policy makers within the Congress and DoD in making strategy and force structure decisions with costs in mind. A key question is what will future conflict look like and how much resources should be committed to large conventional forces.

To effectively analyze the desired size and characteristics of tomorrow's military, we must take a hard look at feasible, real-world contingencies, one of which could be conflict with China. This thesis examines the strengths and weakness in both the U.S. and China, and uses Game Theory to model conflict between the two countries using the Correlates of War data to measure national power. Finally, the relative merits of diplomacy and irregular war are examined in order to determine the best method for the United States to achieve an advantage when interacting with China in the pursuit of national objectives.

14. SUBJECT TERMS Irregular War, Irregular Warfare Capabilities, Irregular actions, Game Theory, Power Transition, Correlates of War, U.S., China, Strategic, Conventional	**15. NUMBER OF PAGES** 131
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	**18. SECURITY CLASSIFICATION OF THIS PAGE**	**19. SECURITY CLASSIFICATION OF ABSTRACT**	**20. LIMITATION OF ABSTRACT**
Unclassified	Unclassified	Unclassified	UU

NSN 7540–01–280–5500

Standard Form 298 (Rev. 2–89)
Prescribed by ANSI Std. 239–18

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MODELING CONFLICT BETWEEN CHINA AND THE UNITED STATES

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MASTER OF SCIENCE IN DEFENSE ANALYSIS

from the

NAVAL POSTGRADUATE SCHOOL
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ABSTRACT

As the United States exits Iraq and Afghanistan, it must begin the long process of preparing for future challenges. There is considerable pressure on policy makers within the Congress and DoD in making strategy and force structure decisions with costs in mind. A key question is what will future conflict look like and how much resources should be committed to large conventional forces.

To effectively analyze the desired size and characteristics of tomorrow's military, we must take a hard look at feasible, real-world contingencies, one of which could be conflict with China. This thesis examines the strengths and weakness in both the U.S. and China, and uses Game Theory to model conflict between the two countries using the Correlates of War data to measure national power. Finally, the relative merits of diplomacy and irregular war are examined in order to determine the best method for the United States to achieve an advantage when interacting with China in the pursuit of national objectives.

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LIST OF ACRONYMS AND ABBREVIATIONS

APOD	Aerial Port of Debarkation
bcm	billions of cubic meters
CBO	Congressional Budget Office
CCP	Chinese Communist Party
CMC	Composite Military Capability
CNOOC	China Offshore Oil Corporation
CNPC	China National Petroleum Corporation
COIN	Counter-insurgency
COW	Correlates of War
CRS	Congressional Research Service
CSG	Carrier Strike Group
CVN	Aircraft Carrier-Nuclear
DoD	Department of Defense
EIA	Energy Information Agency
GDP	Gross Domestic Product
IW	Irregular War
MOS	Military Occupational Specialty
PEC	Primary Energy Consumption
PLA	People's Liberation Army
PLAAF	People's Liberation Army – Air Force
PLAN	People's Liberation Army - Navy
PRC	People's Republic of China
RMB	Remimbi
SIPRI	Stockholm International Peace Research Institute
SPOD	Sea Port of Debarkation
UCAV	Unmanned Combat Ariel Vehicle
UCDP	Uppsala Conflict Data Program
WTO	World Trade Organization

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ACKNOWLEDGMENTS

To Leah, whose selflessness allowed me to claim that work on my thesis prevented me from doing the dishes many nights—I love you and am glad you're with me as we move out and draw fire in life.

To Josh, who, in the seventh grade, does math *way* better than me, I'm proud of you and love you, too!

To Doowan Lee, who taught me great power politics and power transition on a chilly evening in San Francisco.

To Brian Greenshields, who caught every mistake a writer can make with the English language.

To Dr. William Fox, whose endless patience made this possible, and for convincing me I wasn't really doing math at all.

Finally, many of my thoughts in this thesis have been shaped to such a great extent by John Mearsheimer's *Tragedy of Great Power Politics* (Norton, 2001) and Michael Horowitz's *Diffusion of Military Power* (Princeton University Press, 2010) that I must acknowledge their own vision, here, as well as in the body of this thesis.

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I. INTRODUCTION, QUESTION AND THESIS

The rise of China has been documented by many noted sociologists, political scientists, and economists.[1] The U.S. and China have many interests that coincide around the world creating a potential for conflict, and so the stakes are high for finding a way for the U.S. and China to co-exist peacefully, working through problems without resorting to war. While the quest for peace is the preferred aim of policy, it is prudent to discuss the potential for conflict. The central question that drives this study is, "Can the United States 'win' a conventional war against China and if not, are there offensive irregular warfare activities that can deter China while being advantageous to the U.S." Modeling can provide input to policy makers by providing insight into three questions: 1) How would the U.S. fare in a conventional war with China, 2), Would the U.S. fare better using IW against China, and 3), Is there a combination of conventional force, IW, and diplomacy that can achieve U.S. strategic objectives? Finally, the models in this study are meant to provide mathematical 'insights' into whether IW is an essential element of U.S. national strategy.

The international system is always under pressure. Dominant countries attempt to maintain the current economic system that maximizes their own privileges, but rising powers are tempted to overturn the status quo in order to establish their own privileged system. One key theory of power transition was first forwarded by A Organski in his book, *World Politics*.[2] He described an international system in which one or only a few great powers sit atop a pyramid, ensuring stability, while rising states challenge the leaders for control of the international system. From 1945 to 1990, control of the international system was

[1] The rise of China has spawned a vast corpus of work on both sides of the Pacific. Two of the best, used frequently in this thesis, are Susan Shirk's *China: Fragile Superpower* (Oxford University Press, 2007) and Barry Naughton, *The Chinese Economy: Transitions and Growth* (MIT Press, Cambridge MA, 2006)**.** Other sources are referenced throughout this thesis.

[2] Ken Organski. World Politics (Knopf, New York,1960). For a work which greatly expands and explains Organski's original work, see Ronald Tammen, Jack Kugler (eds), *Power Transitions: Strategies for the 21st Century* (Seven Bridges Press, New York 2000).

contested between the forces of the West, led by the United States, and international communism, led by the Soviet Union. The United States *won* that cold war with the effective dissolution of the Soviet Empire in 1991 and the adoption by most countries of free market principles, albeit with varying levels of social control on the part of governments. However, in the late 1990s, a new player emerged on the global scene through its own market (but not political) liberalization- China.

China has the opportunity to upset the contemporary international economy that has largely been the creation of the world's dominant economic and military power, the United States.[3] It is in the U.S.' best interest to maintain the current global economic system but China (specifically, the Chinese Communist Party (CCP) must continue to expand economically in order to produce and distribute wealth internally in order to ensure domestic stability. Inevitably, China must exercise power in the international arena in the search for greater resources.[4] This search for greater resources has been the cause of many wars: Rome destroyed Carthage in order to dominate trade in the Middle Sea while Japan turned to aggression in order to secure the natural resources of Southeast Asia.[5] Today China is rattling its military might in the South China Seas.[6] Power transition is not so much theoretic flotsam. Towards the end of the 19th century, England bestrode the globe with unmatched naval and economic might, but by the early 20th century, things had changed. Germany had unified, with its economy growing larger than England, and had begun building a naval program to challenge for mastery of the seas. Two wars for world domination followed.

---

3 Robert Gilpin, "Three Models of the Future," *International Organization*, vol. 29, no. 1 (Winter, 1975): 37–60.

4 Gilpin, Robert, *The Political Economy of International Relations* (Princeton University Press, Princeton, NJ, 1987), 8

5 Kaoru Sugihara, "The Economic Motivations behind Japanese Aggression in the Late 1930s," *Journal of Contemporary History*, vol. 32, no. 2 (Apr 1997): 259–280.

6 Carlyle Thayer, "China's New Wave of Aggressive Assertiveness in the South China Sea," *International Journal of China Studies*, vol. 2, no. 3 (Dec 2011): 555–583.

The framework for international relations is configured by the states with the power to enforce it. These dominant states seek to organize and maintain the system in order to maximize their economic benefits. The British, Roman, Napoleonic and Soviet empires were designed to extract resources from the edge back to the center.[7] The modern U.S. economic empire, although predicated on the free-market, does the same. From the Monroe doctrine to the latest war in Iraq, the U.S. has used conflict to maintain the political and economic system. With China's need of access to resources to continue its own domestic programs, conflict might be unavoidable.[8]

A. POWER TRANSITION

Power transition, a theory of international relations, explains the current relationship between the U.S. and China in which the U.S. is the dominant nation, and China is the challenger (see Figure 1).[9]

[7] I found Michael Doyle's *Empires* (Cornell University Press, Ithaca NY, 1986) very helpful since it meshed perfectly with his *Ways of Wars and Peace* used later. Also J. *Empires of the Atlantic World* (Yale University Press, New Haven CT, 2006) and E. Eisenstadt, *The Political Systems of Empires* (Free Press, Glencoe, IL, 1963). Of particular interest is Leo Blanken's *Rational Empires* (University of Chicago Press, Chicago, 2012).

[8] In this I agree with John Mearsheimer's analysis in *Tragedy of Great Power Politics* (Norton, New York, 2001). Ominously, the economic and information wars which the two countries are certainly already engaged in will inevitably escalate to kinetic interaction. Currently using the COW data, China is not at 80% parity with the U.S., which Organski and Kugler defined as the beginning of transition. For this, see Organski and Kugler, *The War Ledger* (University of Chicago Press, 1980).

[9] One of the best books which describe the U.S. perspective on the current U.S. role in international relations is William Zartman, ed*., Imbalance of Power: U.S. Hegemony and the International Order* (Lynne Rienner Publishers, Boulder CO, 2009). The best journal article on the Chinese perspective is Alastair Johnston, "Is China A Status Quo Power," *International Security*, vol 27, no. 4 (Spring 2003): 5–56. Sources which support China's inclusion as a great power are more disparate. Some of the more readable ones include Xia Liping, "China: A Responsible Great Power," *Journal of Contemporary China*, vol. 10, no. 26 (2001), and Zheng Bigian's, "China's Peaceful Rise to Great Power Status*," Foreign Affairs*, vol. 84, no. 18 (2005). Also, Yong Deng and Thomas Moore, "China Views Globalization: Toward a New Great Power Politics," *The Washington Quarterly*, vol. 27, Issue 3 (2004). These articles predicate China's great power status on its economic status, less on its military muscle.

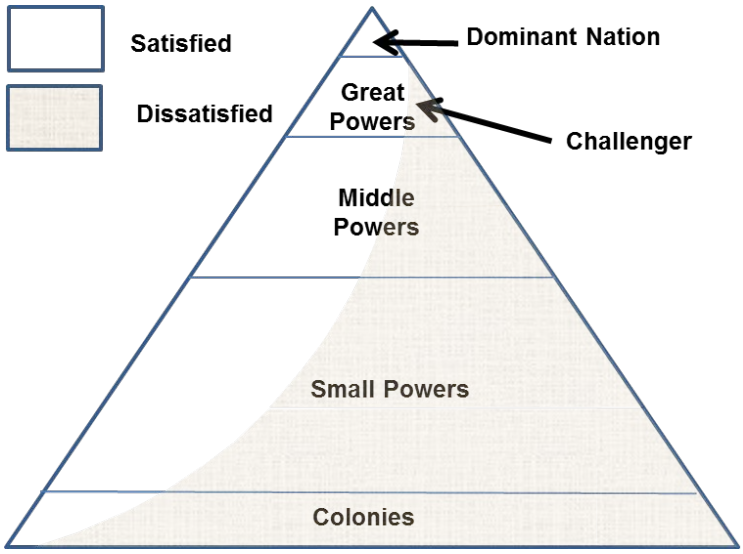

Figure 1. Pyramid showing relative positioning of dominant and challenging nations; from Organski.

Organski accurately predicted this situation, in which the U.S. controls the four elements in order to ensure economic stability. These consist of raw materials, sources of capital, markets, and holding competitive advantages in the production of highly valued goods.[10] Between states, the international system is comprised of political institutions, economic institutions, security institutions, and the rules of conduct between them, which must also be controlled.[11] In a power transitory phase, there is a growth of economic development in a challenger, based on stable territorial sovereignty and a large population. This leads to significant increases in national power for the challenger. As the challenger's growth accelerates, it will become dissatisfied with international structure and division of resources. The resulting conflict is the product of attempts to change

10 Robert Keohane, "Theory of hegemonic Stability and Changes in *International Regimes*, 1967–1977," Ole Holsti, eds. *Changes in the International System* (Boulder CO. Westview Press. 1980).

11 Ibid.

the balance of power[12] in order to increase economic privileges on the part of the challenger, at the expense of the dominant power. The primary tenent of power transition is that the dominant nation does not willingly give up its closely hoarded economic and political privileges and challengers rarely are happy with a second class status. [13] Inevitably, the two countries will come into conflict over mutually exclusive objectives, confronting each other over the current order and 'spheres of influence" (see Figure 2).[14]

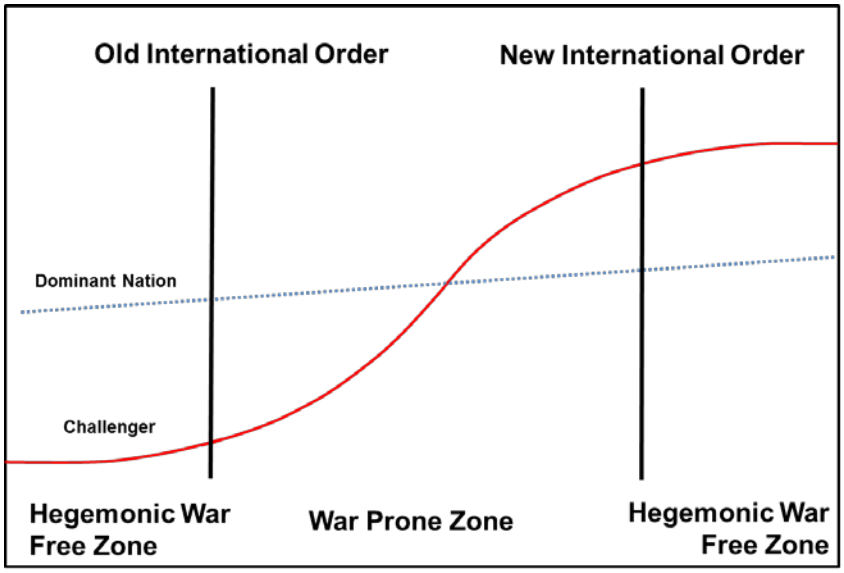

Figure 2. High Growth/War Prone Zone; from Lai.

The resulting wars often devastate both nations, changing the international landscape. The wealth of empirical support for Power Transition theory has created a preliminary consensus among many international relations

[12] Balance of power is a phrase with a myriad of meanings. See Inis L. Claude, *Power and International Relations* (Random House, New York, 1962) for a good literature review of this subject. I have adopted the definition of power to be the ability to influence other nations, and since military might has primacy in influence (this is itself a debated thesis), and changing the balance of power involves using military force to decrease the military capability of another.

[13] Jack Levy, *War in the Modern Great Power System, 1495–1975* (University Press of Kentucky, Lexington, KY, 1983).

[14] Robert Gilpin, *War and Change in World Politics* (Cambridge University Press, New York, 1981).

researchers that the probability of conflict increases dramatically when two countries are roughly equal and decreases comparably when would-be adversaries are vastly different in power.[15] However, the perceived inequality of the system still results in dissatisfaction among all lesser powers and creates a desire to change the system.

John J. Mearsheimer's *The Tragedy of Great Power Politics* presents a new version of realism, called offensive realism that posits states will pursue strategies that maximize their security at each other's expense.[16] The tragedy is that their will to dominate actually encourages conflict. This is because 1) there is no central authority to impose order, 2) states, the primary actor of the international order, always develop offensive military capability (and the higher the aim of the state, the greater the capability), and 3) states can never know what other states are planning.[17] Mearsheimer's thesis significantly takes power transition closer to general war than previous theorists would hope. States unrelentingly pursue power in order to increase their own security[18] and great

15 Ronald Tammen, ed, *Power Transitions: Strategies for the 21st Century* (University of Michigan Press, Ann Arbor, MI, 2000), pg 63.

16 John Mearsheimer. *The Tragedy of Great Power Politics (*New York, Norton & Co. 2001). See also Robert Gilpin's *War and Change in World Politics* (Cambridge University Press, New York, 1981). The interplay of defensive weapons and insecurity about other states' aims mean that even defensive weapons can appear offensive in nature. An interesting book that talks the application of force, but has some interesting insights about the psychology of deterrence is Robert Art (ed) *The Use of Force: Military Power and International Politics*, 4th Edition **(**Rowan & Littlefield, Lanhan MD, 2004).

17 Mearsheimer,*Great Power Politics,* 2001.

18 Hans Morgenthau, *Politics Among Nations* (Knopf, New York, 1972) and Ken Waltz's *Man, the State, and War* (Columbia University Press, New York, 2001, and Waltz's *Theory of International Politics* (Waveland Press, Long Grove IL, 2010).

powers[19], in this case, the U.S. and China, seek to gain power at the expense of others. The dominant power tries to defend the system when changes will benefit the challenger, and the undermine change in order to benefit itself.[20]

History actually holds many examples of conflict between states in power transition, even since 1945 (see Figure 3). The most famous in ancient history is perhaps the war between Athens and Sparta. Athens, building on the cooperation of the Delian league, created to confront the Persian invasion, created its empire of tribute paying and trading city states. Subsequently, Athens fought a protracted twenty-seven year war with Sparta and the Peloponnesian League over control of Greece. In his history, Thucydides provides the reason for this contest: "The real cause for this war was the growth of Athenian power and the fear generated in the minds of the Spartans that made the war inevitable."[21] Other ancient contests occurred. Rome and the Carthaginians and the Arab Empires are several that are well catalogued. The long time periods involved in power transitions are illustrated by the Roman and Persian empires experiencing multiple power transitions, often surviving setbacks with their empires. Modelski called this the 'long cycle' of power transition.[22] In recent history, Germany and Japan both attempted to gain a dominant position against the existing

[19] There is much literature about the definition of a great power. My primary source has been Jack Levy's *War in the Modern Great Power System*, 1495–1975 (University Press of Kentucky, Lexington, KY, 1983) and also, Mearsheimer's *Tragedy of Great Power Politics*. GR Berridge and John Young provide an alternate idea of great power in "What is a Great Power," *Political Studies*, vol. 36, no. 2 (Jun 1988) who write that "the idea that a great power requires formal recognition or 'general interests' or an inclination to 'responsible' behavior and also rejects the view that the demonstration of great military power in war is either a necessary or a sufficient condition of being a great power. They conclude that a great power is one whose reputation for existing or latent military strength may be equaled but not significantly surpassed by that of any other power." This is the popular idea that 'influence' is a power in its own right, not connected to any sort of 'hard' power. I've rejected this notion since, one, Switzerland does not run the world, and two, in a greater picture, their definition is subsumed in that put forward by realists.

[20] Mearsheimer, *Great Power Politics*, 2001.

[21] Thucydides, *The Peloponnesian War*, trans. Rex Warner (Penguin Books, New York, 1972).

[22] George Modelski described his long cycle theory fully in his Long Cycles in World Politics (University of Washington Press, Seattle WA, 1987). The journal *International Organization* also produced a special issue on long cycle theory; see *International Organization*, Vol 41, No 2 (1987).

international system, but both lost. Transition through war is most common, but transition can also occur through what Robert Gilpin referred to as shared norms and values.[23] Great Britain, although on the winning side of World War II, declined, lost its empire, and transitioned peacefully, with the United States assuming global leadership. Transition through cooperation would usually occur only in local hierarchies, when the two countries share common political and cultural philosophies. Transition between two countries in different local hierarchies would most likely occur through conflict since differing political systems and international goals are the driving factors in the development of differentiated local hierarchies.

With the advent of modern economies and strategic reach, empires took on a global nature. The Portuguese, Spanish, Dutch, French and British empires took turns imposing colonial rule across much of the world. In the twentieth century, the hegemonic competition of the World War period led to the destruction of the German and Japanese empires and so weakened Britain that her colonies were eventually emancipated. As the speed of communication has increased, and thus made the world a smaller place, power transitions seem to be occurring more quickly. For example, the Roman Empire[24] lasted over a thousand years and successfully overturned the contemporary international order by defeating the Carthaginians and later successfully defended their own position against the Persians. Additionally, one can date the rise of the British to 1588 and the Spanish Armada's failure. While devolving the imperial possessions took another forty years, Britain's control over enough material resources to count as a great power effectively ended in 1945.

---

[23] Gilpin, *War and Change,* 1981.

[24] I am including the eastern empire after 476, so the inclusive dates are 264 BCE, the start of the Punic Wars with Carthage, through 1071 CE, and the Battle of Manzikert where the Byzantine emperor Romanos IV Diogenes was captured.

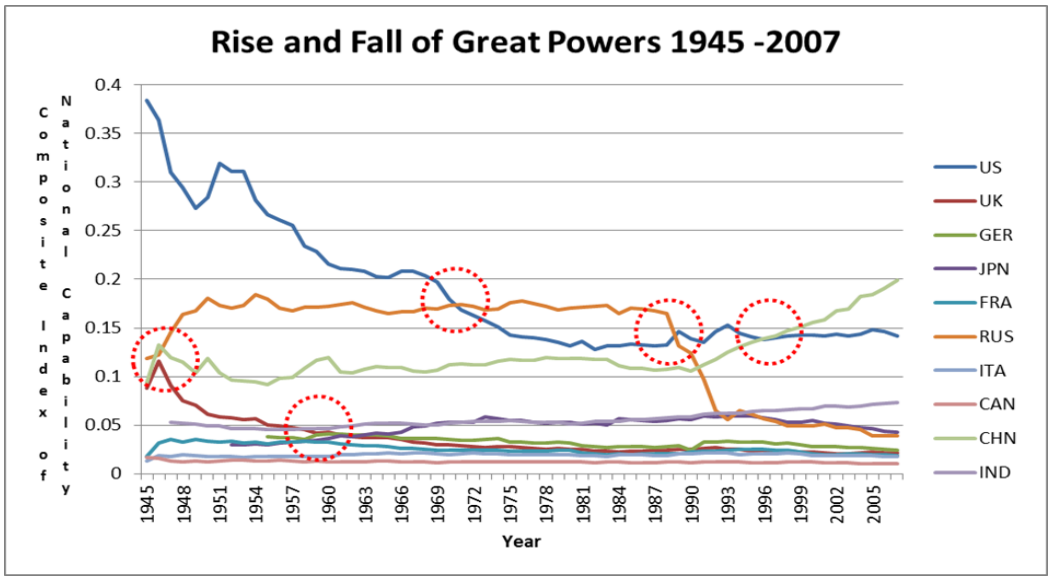

Figure 3. Power Transitions among Great Powers since 1945; source COW.

While the thought of war between China and the U.S. is distasteful, as military professionals, we must consider it. Most policy makers see China as a giant, benevolent 'Asian tiger', a larger version of South Korea or authoritarian Singapore. Unfortunately, the comparison stops at the incredible economic output and geographical position. China's huge population and natural resources will continue to move China into the upper stratosphere of economic capability. This economic expansion allows China to devote greater resources to developing a military capable of force projection. As this occurs, China will move to dominate

eastern Asia, which already appears to be happening.[25] Beyond the security agreements between Japan and the U.S., this groping for resources will bring China into direct conflict with the U.S.

The underlying girder of any conflict in power transition is as mentioned above, power. The most obvious and simple way to determine the power of any state is too tally up its military hardware, numbers and capabilities, and simply list the states, from top to bottom. The state with more 'stuff' wins. This is a greatly simplified definition, but generally, the realist school of international relations supports this type of definition of power. However, in order to more effectively model power transition, the question that must be explored is how the states involved create power, that is, their domestic economic situation. While this thesis is not a compendium of dreary economic data, I do propose to explore the major economic indicators of both China and the U.S. This is because, above all, a strong economic position is required to fund all the expensive military hardware required to either deter challengers in a 'balance of power' situation or attack and destroy challengers in the offensive realism of Mearsheimer. A large economy is usually predicated on large populations with easy access to natural resources,

[25] A great thesis on Chinese hegemonic ambitions from as far back as the 7th Century BCE, see Steven Mosher's *Hegemon: China's Plan to Dominate Asia and the World* (Encounter Books, San Francisco, CA, 2002). For an excellent look at how China will engage in economic warfare, see Peter's Navarro's, *The Coming China Wars* (Financial Times Press, New York, 2007). Also see Aaron Friedburg, *A Contest for Supremacy* (Norton, New York 2011). Henry Kissinger, a long time China Hand, writes about possible cooperation in "The Future of U.S. Chinese Relations: Conflict is a Choice, Not a Necessity*," Foreign Affairs* (Mar/Apr 2012). Recently, major news organizations have begun paying attention to Chinese movements in the South China waters. See Jane Perlez, "*China Asserts Sea Claim with Politics and Ships,"* New York Times, August 11, 2012, U.S. Edition online and *The Wall Street Journal*, "The Bully of the South China Sea," August 10, 2012, U.S. Edition online. The news magazine *The Economist* also has followed China closely on this issue. See "*Could Asia really go to war over these? The bickering over islands is a serious. threat to the region's peace and prosperity,"* Sep 22nd 2012, print edition, *"Protesting too much: Anti-Japanese demonstrations run the risk of going off-script,"* Sep 22nd 2012, The Economist' blog, Clausewitz: Defence, security and diplomacy, "China's aircraft carrier: 58,500 tons of coincidence, " Sep 26th 2012, and a short net video *"Rising tensions in the East China Sea: Avoiding escalation,"* Sep 17th 2012, No 18:04 by *The Economist Online*, explains the recent anti-Japanese demonstrations in the context of the Sino-Japanese disagreement about the Senkakus islands.

and the most dangerous state would be the challenger with a rapidly expanding economy.[26]

Power, then, is more than the number of divisions and carriers a state controls, but the latent capabilities a state can marshal when competing with peers. This latent capability is broadly socio-economic in nature. A state's wealth, ability to create wealth, and the fundamental chutzpah of its population are all assets in the accumulation of power.[27]

In this thesis I will use primary energy consumption by the United States and China as a way to measure the economic output of each country. Because wealth is notoriously difficult to measure, energy consumption is a simple way to measure the relative wealth of a state's population since it measured the ability of the population to harness energy to produce products, both industrial and service oriented.

My hypothesis is that the U.S. and China are already in power transition, as China begins to amass global influence through its economic growth and real military power. A close examination of China's growth over the last two decades in Section Two and a study of the data from the *Correlates of War* database will allow me to build a game theory model of conflict between the United States and China in order to gain insights into strategies for each country. I will take the results of that model and determine how diplomacy and irregular war can deter China and postpone transition, thereby maintaining the U.S.' dominant position in the international system.

B. WHY GAME THEORY?

If Mearsheimer is correct, and conflict with China is unavoidable, then game theory might provide valuable insights into understanding the likely

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[26] The effect of population of military power is described the Katherine Organski and AFK Organski in *Population and World Power* (Knopf, New York, 1961).

[27] Klaus Knorr presents effectively simple descriptions of the latent power of states in *The War Potential of Nations (*Princeton University Press, Princeton NJ, 1956) and his *Military Power and Potential* (DC Heath, Lexington MA, 1970).

outcomes of conflict.[28] Since the reality of international relations is so comprehensively complex, models may be constructed to simplify the problem and the analysis. A simple model can be used to draw attention to factors in the situation which might be overlooked otherwise.[29] The game theoretic model with its reasoning and analysis can be used to construct alternatives to the solutions offered in the game, providing a multi-person viewpoint of the how the U.S. should deal with China in order to avoid catastrophic conflict. This game is built from solid empirical evidence so as the strength and validity of the model increases, its analysis might lead to justifiable policy recommendations. A major assumption in game theory is that the players are rational. Rational players imply that both players try only to maximize their own outcomes. Individual rational behavior does not dictate that states will act in a rational manner.[30]

The game theory model which is used provides values of combat power which are "abstractions of reality"[31] and are meant to model *combat situations*, not actual weapons systems, which lies to the right of the modeling spectrum.

As the spectrum of modeling above implies (see Figure 4), game theoretic models will differ from reality, sometimes quite a bit. Just as real combat is complex and full of uncertainty, so are models. While many game theorists stress the importance of constructing prescriptive, generic models[32], modeling conflicts based on scientifically defensible data can provide valuable insights. In this thesis, the brief descriptions of national strengths and weaknesses in sections Two and Three are important in order to establish real world limitations on

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28 Some of the oldest proponents of game theory for analyzing international relations are P Green's *Deadly Logic* (Ohio University Press, Columbus OH, 1966) and Anatoli Rapoport' Strategy and Conscience (Harper and Row, New York, 1965). See also Martin's "The Selective Usefulness of Game Theory," *Social Studies of Science*," vol. 8 (1987): 85–95.

29 Peter Bennett, "Modeling Decisions in International Relations: Game Theory and Beyond," *Mershon International Studies Review*, vol. 39, no. 1 (Apr 1995): 19–52. pg 26.

30 Martin Shubik, *On Gaming and Game Theory* (RAND, Santa Monica, CA 1971).

31 Washburn, Alan and Moshe Kress. *Combat Modeling* (Springer Science+Business Media. 2009). pg 1.

32 Bennett, Peter, "Modeling Decisions," 26

national power. Section Five will describe the components of national power in some detail in order to develop and justify the equations which will be used to determine national power.

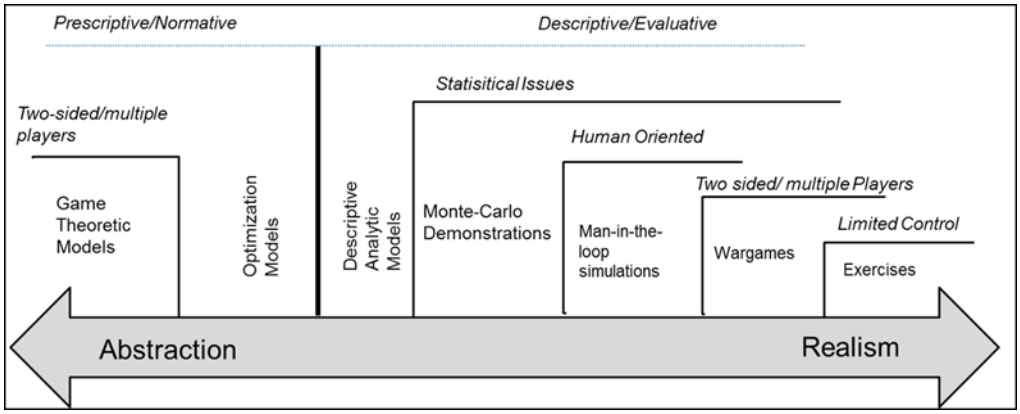

Figure 4. Modeling spectrum; from Washburn and Kress.

This model provides policy makers with insights into how to slow or deter transition with China. Assuming both China and the U.S. will follow the key assumption of rational players, that each side wishes to maximize its payoff with the least amount of risk, then game theory might predict the victor in great power conflicts as far back as the data can support. For example, as seen in Figure 3, there have been other power transitions in history.

The game in this thesis is a non-zero-sum game, predicated on simple numerical extrapolations of national power between the U.S. and China. Then in Section Six, I calculate preferences and cooperation, threats and first moves into that conflict. While the basic form of this game presents a fairly straightforward matrix that pits power against power, this hardly represents the conflicts faced in the everyday world. Problems in the real world do not usually have straightforward results. Non-zero-sum games such as this differ from zero-sum games in that there is no universal winner takes all outcomes. Instead, non-zero-sum games attempt to find a solution that is optimally advantageous to all

players. As solutions decrease in optimal value, the players come closer to a winner take all conflict, zero sum game. Non-zero-sum games are also competitive in that they reflect real world international relations and changes in the international system. In Sections Two and Three, I attempt to demonstrate some of the systemic influencers on U.S. and Chinese national power. Players engaged in a non-zero-sum conflict have some complementary interests and some interests that are completely opposed. For example, the U.S. and China benefit from stability, yet both are increasingly seeking petroleum from the same sources.

There are some assumptions I will make in order to reduce the complexity of reality. For example, instead of tracking individual technological innovations and modeling those interactions (see Figure 5), we attempt to replace individual variables with a 'master' variable which accurately represents them.

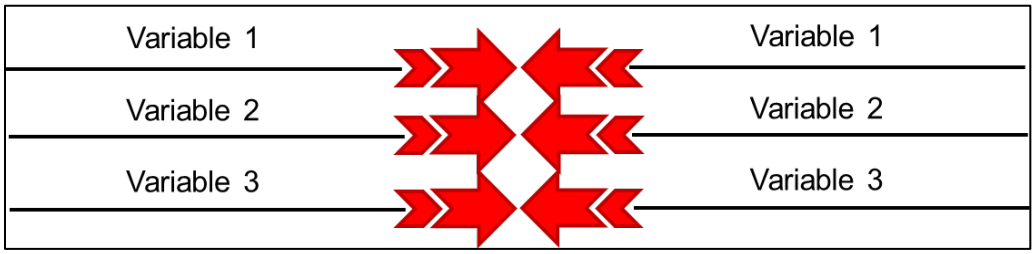

Figure 5 Complex interactions between multiple variables are time consuming and expensive to construct.

For example, in this thesis we model conflict between the United States and China. A more accurate model would match like weapons against like weapons; for example, our best fighter jet against the best Chinese jet, our tanks against their tanks. These infinitesimally scaled models exist at the right end of the modeling spectrum. They are realistic, expensive, and time consuming to execute in a setting which allows in-depth analysis. Instead, we use one variable, Primary Energy Production (PEC) to represent the sum total of all

technologies available to the U.S. and China. This allows us to model a match-up which is much simpler (see Figure 6).

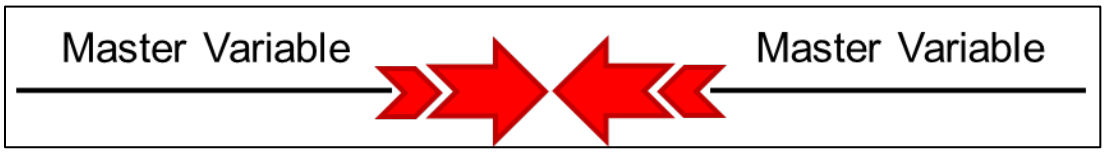

Figure 6 Simplified interactions in complex models.

In Section Six, the primary questions to be answered will concern what level of side payments, called *irregular war* in this thesis, will satisfy China to move to a position more amenable to the U.S. policy. Since game theory stresses the importance of deliberate choices, this second round of games could provide profound policy direction. The model in Section Five is essentially a zero-sum game since we are only interested in a win or a loss by either country. However, in real life, there is usually some chance of cooperation, and these are non-zero-sum games.[33] Since players in games are taken to be motivated by preferences for outcomes,[34] what would influence or disrupt[35] China in its foreign policy? Since democracy and human rights are also a stated goal of the United States, are there moves that can influence China in this regard? While there are two conclusions that will be drawn from the first set of games in this thesis, it will be the second set of games, the cooperation games, which will provide even greater validity, since they will take into account human action.

Problems with Game Theory?

Game theory as a tool to analyze the problems of international relations saw its heyday in the 1950s and 1960s, when social scientists took what was

33 Bennett, "Modeling Decisions," *26*

34 Ibid., 30

35 The draft definition of unconventional warfare provided by the JFK Special Warfare Center at Fort Bragg is *"activities conducted to coerce, disrupt or overthrow a government."*

originally a tool for economists, and applied it the complex problems of international security.[36] Critics have argued that game theory is illegitimate and should not be used to model problems of international relations.[37] They typically allege that its models are "oversimplified, that the theory is inherently repellent, or that the whole notion of rational choice is unrealistic."[38] This last point is particularly troublesome since it is a relatively short leap to charges that the use of game theory is morally unsound since the risks of miscalculation are so high.

Critics point out that even if the underlying assumptions are plausible, the simple matrix format cannot account for a good deal of what is known to be important. Key players, in this case China and the U.S., would react very differently in different situations. Things such as culture and historiography influence to an extraordinary degree how each will react to others moves. Critics claim that the fluid dynamics of crisis management and deterrent brinksmanship will cause rapid changes in a player's preferences. The resulting combinatorial complexity will simply be too overwhelming to model. Many players may have linked actors and may be simultaneously involved in many issues, moving between alliances and states.[39] Finally, the intended audience of this study may perceive this approach to be too highly quantitative, or they may have an inbuilt aversion to anything containing numbers.

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36 Duncan Snidal, "The Game Theory of International Relations," *World Politics*, vol. 38, no. 1 (OCT 1985): 25–57.

37 The reduction of real world structural constraints in game theory, and the subsequent charge that it cannot model the real world is explained in Richard Ashley, "The Poverty of Neo-Realism," *International Organization*, vol. 38 (Spr. 1984): 236–286. Also, the Use of ordinal rankings of preferred outcomes has come under fire because there can appear to be a lack of rigorous inquiry. Robert Jervis wrote about this in "Cooperation under the security Dilemma," *World Politics*, vol. 30 (Jan 1978):167–214. For perhaps the best reading on the limits of game theory, see Martin Shubik's "What is a solution to a Matrix Game," Cowles Foundation Discussion Paper, Yale University, Jul 2012, found at http://COWles.econ.yale.edu/P/cd/d18b/d1866.pdf and Shubik's "Game Theory and Operations Research: Some MUsings 50 Years Later," Working Paper #14, Yale School of Management, May 2001 found at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=271029

38 Bennett , "Modeling Decisions," 27

39 Peter Green, *Deadly Logic (*Ohio State University Press, Columbus, OH. 1966) and Brian Martin, The Selective Usefulness of Game Theory. *Social Studies of Science* vol. 8: 85–95; and Anatoli Rappaport, *Strategy and Conscience* (New York, Harper and Row, 1965).

This is not the case for this thesis. The greater part is a summation of the conventional power, problems and advantages which both the U.S. and China possess. The poli-socio-economic and military sections of this thesis will be familiar and comfortable to the vast majority of readers. The use of a mathematical theory does not mean quantifying everything in sight. In practice, many models avoid the need for much measurement. Describing the outcomes desired by the players can be used instead of utility scales. Often, results do not even depend on having complete order, but only on broad assumptions about what players like or dislike. Indeed, the ultimate purpose of this thesis may be to demonstrate the theoretical premise and outcomes of conflict with China. This would allow the wider military and policy makers to concentrate on the methods Used to achieve preferred outcomes through combat modeling methods along the right of the modeling spectrum (see Figure 4).

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II. THE RISE OF CHINA

In this section we examine the growth and rise of China as an economic power, and its rapidly increasing military power. With its new powerful economy, China is riding a resurgent nationalism which demands respect from the world. The last dynasty in China, the Qing (see Figure 7), even banned maritime trade as beneath the dignity of the middle kingdom, until China was forced open by a series of European military incursions in the mid-1800s. The last dynasty of China attempted economic and political reform in an effort to keep up with Japan, but the subsequent social upheaval brought about by the transition to a mercantilist economy brought on a thirty year revolution. [40]

Mao, the winner of the revolution, closed off China to the world, but did intervene in the Korean War, fought with India in the 1960s, clashed with the

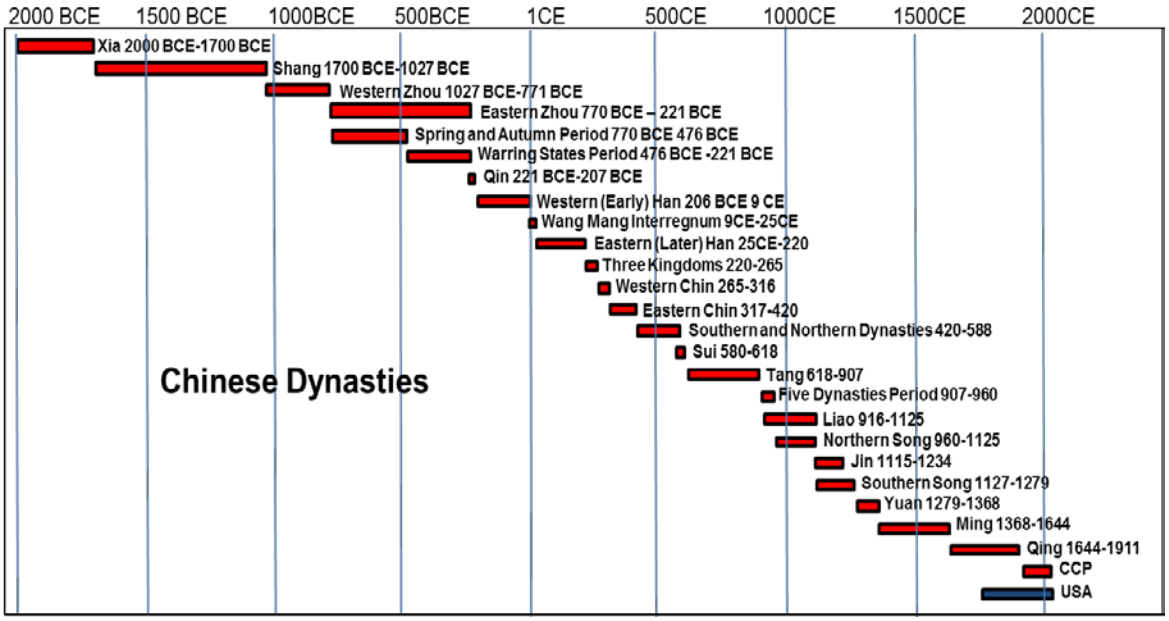

Figure 7. Timeline of Chinese Dynasties with PRC and U.S. included; available from Asianinfo.org.

[40] Jiangling Wu, *Understanding and Interpreting Chinese Economic Reform (*Texere, New York, 2005).

Soviet Army in 1969, and invaded Vietnam in 1979, before turning back.[41] The People's Republic of China (PRC) walled itself off from the world and fell increasingly behind Europe, the United States, Japan, and even Korea and Taiwan.[42] Before 1949 modernization had not occurred internally because of the great respect for Chinese philosophers like Confucius and Lao Tzu who emphasized the middle way; cooperation instead of competition.[43] Chinese traditions based on these philosophers created deeply embedded cultural roadblocks to scientific innovation.[44]

A series of defeats known collectively as 'the opium wars' convinced the Chinese rulers that change was inevitable. From the depths of their despair, the scholar Wei Yuan's influential work *The Illustrated Treatise of Maritime Kingdoms* extolled the West's advantages: a powerful navy, advanced firearms, and industrialized military training.[45] Wei argued that the Chinese could copy the West's innovations in order to gain a powerful military. Wei's impact was great, and the Chinese Army and Navy began to modernize, but at a great price. The central government, corrupt and ineffective, could not marshal the resources necessary to sustain the drive. Japan was better, and the Meijji defeated the Qing in 1895.[46] Following this humiliating defeat, radicals pushed through a series of reforms that stood to change Chinese society fundamentally, allowing for the first time real change in its political and economic structure, but too late to save the Qing dynasty. The ensuing civil war would last forty years and

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[41] A very good, concise Chinese military history is Allen Whiting, "China's Use of Force, 1950–1996, and Taiwan*," International Security*, vol. 26, no. 2 (Autumn, 2001): 103–131

[42] Susan Shirk, *China: Fragile Superpower* (Oxford University Press, 2007).

[43] Katherine Dahlsgaard, Christopher Petersen and Martin Seligman, "Shared Virtue: The Convergence of Valued Human Strengths across Culture and History," *Review of General Psychology*, vol. 9, no. 3 (Sep 2005): 203–213.

[44] Richard Nisbett. *The Geography of Thought: How Asians and Westerners Think Differently and Why* (New York, Free Press, 2003).

[45] Peter Mitchell. The Limits of Reformism: Wei Yuan's Reaction to Western Intrusion." *Modern Asian Studies*, vol. 6, no. 2. (1972): 175–204

[46] Benjamin Elman, "Naval Warfare and the Refraction of China's Self-Strengthening Reforms into Scientific and Technological Failure, 1865–1895," *Modern Asian Studies*, vol. 38, no. 2 (May 2004): 283–326.

eventually lead to the establishment of Mao Zedong's Chinese communist party (CCP) government in 1949.

A. CHINESE ECONOMIC REFORMS

Although the communists made immediate changes such as land reform and some initial economic restructuring, the CCP rejected any political reforms. Instead, Mao chose to replicate the Soviet dictatorship in China. David Lai writes that "in doing so, the CCP created a 'modern' government that ironically retained the fundamental flaws of past Chinese government."[47] Multiple political purges led by Mao decimated the intellectual classes and severely retarded economic development. Grandiose plans such as the Great Leap Forward and the Cultural Revolution were designed to thrust China out of its rural backwardness, yet ended up killing as many as 30 million citizens in the largest famine of the 20th century.[48] In some provinces, the birth rate collapsed.[49] At the time, China was one of the poorest countries in the world. Economically, it was where the United States had been in the 1820s.[50] The rise of Deng Xiaoping in the late 1970s and his development policy finally began to lift China out of its self-destruction.

As those reforms began, the income per person in China was about two-hundred dollars.[51] Deng was determined to link the natural resources of China

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47 David Lai. *The United States and China in Power Transition* (Strategic Studies Institute, Dec 2011), 42

48 Izhe, Peng, "Demographic Consequences of the Great Leap Forward," *Population and Development Review*, vol. 13, no. 4 (Dec 1987): 639. For the single best source on the failure of the central planning system to improve living standards, see TP Lyons, "Interprovincial Disparities in China: Output and Consumption, 1952–1987*," Economic Development & Cultural Change*; Vol. 39 Issue 3(Apr 91): p471. Robert Ash does a particularly good job in explaining Mao's policies during the Great Leap in his "Squeezing the Peasants: Grain Extraction, Food Consumption and Rural Living Standards in Mao's China," *The China Quarterly*, vol. 188 (Dec 2006):959–998. Also, Joseph Chai, "Consumption and Living Standards in China," *The China Quarterly*, no. 131, Special Issue (Sep 1992): 721–749 and Michael Field's "China's Industrial Performance since 1978," from the same special issue of *The China Quarterly*.

49 Naughton, Barry, *The Chinese Economy: Transitions and Growth* (MIT Press, Cambridge MA, 2006).

50 Hu, Angang, *China in 2020: A New Type of Superpower (*Brookings Institution Press, 2011, ebook).

51 World Bank, found at http://data.worldbank.org/indicator/NY.GDP.PCAP.CD?page=6.

to the political process. He was less concerned about per capita income than the CCP being able to mobilize resources.[52] By 2005 the growth was stunning. China reported that its economy was 18.4 trillion RMB, which was roughly $2.2 trillion, about a fifth of the U.S. economy.[53] It was enough to move China into fourth place, behind Germany (third) and Japan (second) as the world's largest economy.[54] By 2009, it's GDP of $5.4 trillion (in constant U.S. dollars) had moved it into second place.[55] By 2011, per capita income in China was $5500, still far behind the U.S., at $48,000, but the movement is real and has lifted almost 400 million people out of poverty.[56] That is a 500% increase for the average Chinese family in just one generation! There has been no wealth creation like that in so short a time anywhere else in the world.

China has not been content to rely on heavy industry alone to drive its economic engine. The CCP is investing heavily in education. Scientific production relies on the creation of networks of knowledge sharing and the Chinese government is working hard to harness its human capital. Chinese universities graduated ten thousand PhD-level engineers in 2009, about 2000 more than the United States.[57] The quality of Chinese education is improving. Chinese scientists have developed bio-engineered crops and made advances in stem-cell research. China has six universities in the top 50 in pharmacology, toxicology and pharmaceutics, and the Hong Kong University of Science and Technology is among the top universities in the fields of computer science, engineering and chemistry.[58] Chinese engineers have invented a new civilian

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[52] Chow, Gregory, *The Chinese Economy (*World Scientific Publishing, Teaneck, NJ, 1987).

[53] National Bureau of Statistics of China, 2006 China Statistical Yearbook.

[54] World Bank, found at http://data.worldbank.org/indicator/NY.GDP.PCAP.CD?page=6.

[55] International Monetary Fund (IMF), World Outlook Economic Database (2012). However, the World banks massive International Comparison Project; a study that converts domestic estimates in national currencies to the U.S. dollar devalued its 2005 estimate of China's GDP by %40.

[56] World Bank, found at http://data.worldbank.org/indicator/NY.GDP.PCAP.CD?page=6.

[57] CNNMoney, Desperately Seeking Math and Science Majors," 29 JUL 2010.

[58] OECD Science, Technology and Industry Scoreboard, 2011.

nuclear reactor that is cleaner and safer than current designs.[59] China became the third nation to send a man to space when astronaut Yang Liwei went into orbit in 2003. While the United States remains the largest supporter of research and development (R&D) in the world, China's domestic research and development expenditures have grown fast. In 2009, Chinese companies became the second largest supporter in the world, investing about 154 billion U.S. dollars into research and development.[60]

In just twenty-five years, the Chinese people have experienced a major upgrading of their living standards. According to the World Bank, since 1979, China's reforms have lifted four hundred million people out of poverty (at the $1.25 per day expenditure level)61. Over the past fifteen years, according to UNICEF, China has made great strides in reducing malnutrition among children, halving its percentage of underweight children, and reducing the death rate for children under the age of five by a staggering sixty-five percent![62] Seeking to capitalize on the new economy in China, millions of peasants have moved to cities, averaging eight percent a year since the early 1980s.[63] This equates to almost two hundred million people not living in the province in which they are registered. This has expanded the urban population from 17.9 percent in 1978 to

[59] Wall Street Journal, "Bill Gates on the Future of Nuclear Power," Saturday, 13 Oct 2012, and CBS Seattle, "Bill Gates Talking to China to Develop Nuclear Reactor," 7 Dec 2011.

[60] World Bank or OECD Science Report, 2010.

[61] For many years, the World Bank Used $1 dollar a day as the poverty level; in 2008, this was revised slightly upward to $1.25 per day. See http://data.worldbank.org/indicator/SI.POV.GAPS.

[62] These amazing statistics are derived from the United Nations organization, UNICEF, which compiles comprehensive statistics on children's health in every country in the world. Found at http://www.unicef.cn/en/index.php?m=content&c=index&a=lists&catid=25.

[63] Cindy Fan, *Migration, the State, and the Household* (Routledge, New York, 2008). For an explanation of urbanization and how China attempts to manage it, read Lawrence Ma and Ming Fan's "Urbanization from Below: The Growth of Towns in Jiangsu, China," *Urban Studies*, vol. 31, no. 10 (Dec 1994):1625–1645, and Frederic Deng and Youqin Huang's "Uneven Land Reform and Urban Sprawl," *Progress in Planning*, vol. 61 (2004): 211–236 and Sidney Goldstein, "Urbanization in China, 1982–1987," *Population and Development Review*, vol. 16, no. 4 (Dec 1990): 673–701

41.8 percent in 2004.[64] In early 2012, the percentage of urban dwellers surpassed the percentage of rural population for the first time.[65]

Population is the ultimate arbiter of economic growth. Without people, mines are empty and factories sit idle. The massive internal migrations are really a pre-cursor to growth. Even under Soviet-style central planning, collective agriculture, and isolation from the world economy, the Chinese economy still managed to grow at a respectable six percent annually. But because agricultural output didn't grow and population did, Chinese living standards remained stagnant—per capita food consumption was no better in the 1970s than it was in the 1950. Deng Xiaoping wrote that "one important reason for China's backwardness after the industrial revolution in Western countries was its closed-door policy," and that opening the door would enable China "to make use of capital from foreign countries and of their advanced technology and experience in business management."66 Taking advantage of the West's need for cheap labor, China's GDP grew at an average annual rate of 10 percent from 1978 to 2004 (see Figure 8). Even more remarkable, China's per capita GDP grew at 8 percent per year, bringing new purchasing power to individuals.[67] It was a classic momentum shift, in which China used what the est viewed as a weakness, and turned it into a great strength.

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64 Naughton, *Transitions and Growth*, 2006.

65 *Bloomberg News*, "China's Urban Population Exceeds Countryside for first time," 17 Jan 2012.

66 The quotes from Deng Xiaopeng are taken from Wu Jinglian's *Understanding and Interpreting Chinese Economic Reform* (Thomson Southwestern, Mason, OH, 2005). Deng's personal narratives can be found at http://archive.org/search.php?query=Deng%20Xiaoping%20AND%20collection%3Aopensource.

67 Hu Angang, "China's Economic Growth and Poverty Reduction 1978–2002," IMF presentation, November 2003, New Delhi, India, found at http://www.imf.org/external/ns/search.aspx?NewQuery=angang&submit.x=0&submit.y=0&col= and Carsten Holz' "China's Economic Growth 1978–2025," *World Development*, vol. 36, no. 10 (2005): 1655–1691.

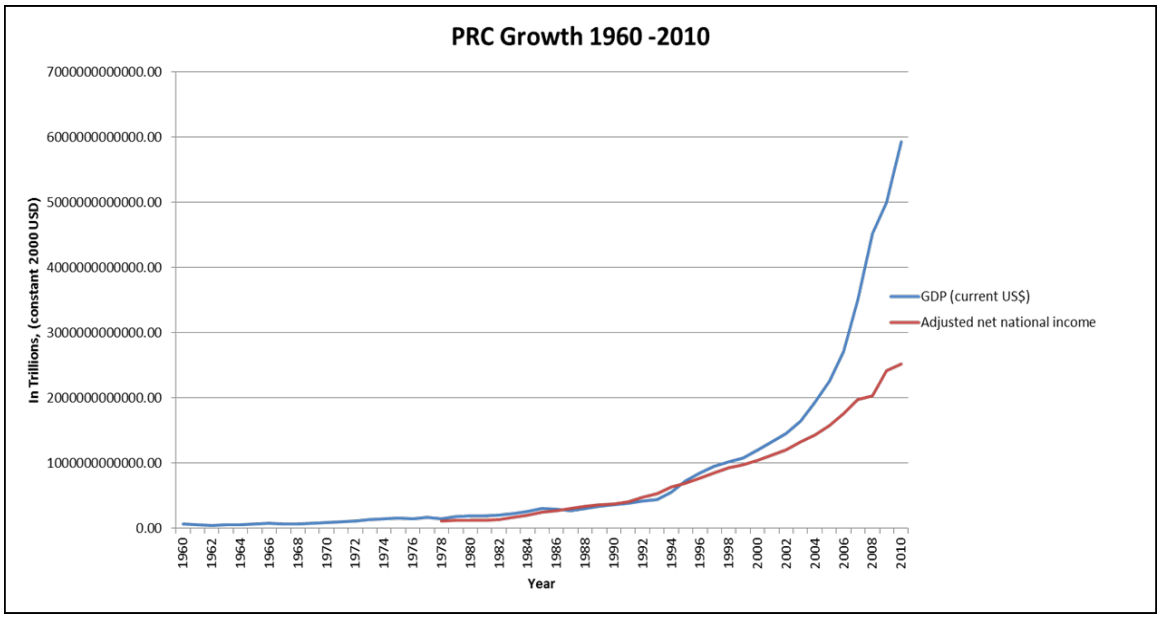

Figure 8. Chinese (excluding Taiwan) GDP and National Income Growth; source, IMF.

The original emphasis during the 1980s was to empower local authorities.[68] The CCP won over the provincial officials to the liberal reforms by allowing them to keep most of the revenues instead of sending the taxes to the national treasury in Beijing.[69] But beginning in the mid-1990s, the central government, worried that it was on the brink of fiscal crisis and national disintegration similar to what had caused the Qing dynasty to collapse, started to rebuild its capabilities. The provinces were strong-armed into supporting tax reform in 1994 that brought more revenues into the central coffers. Soon, in an effort to ensure the loyalty of the PLA after the shock of Tiananmen, the PLA experienced burgeoning budgets.[70]

[68] Susan Shirk, *The Political Logic of Economic Reform in China* (University of California Press, Berkeley, CA, 1992).

[69] Shirk, Susan, *China: Fragile Superpower* (Oxford University Press, 2007). pg21.

[70] G. A. Fowler "*World news: China counts the cost of hosting the Olympics; social programs are weighed beside image building*," *Wall Street Journal,* (2008, Jul 16): 12-A.

B. THE CHINESE SOCIAL CONTRACT

Today, however, the CCP is beginning to experience the stress of having to choose between guns and butter. The CCP must continue to attract investment in order to continue the job creation that is the basis of its 'social contract'. While foreign companies are eager to take advantage of cheap labor, the government must fund the massive population shifts from the countryside to the manufacturing cities. The burden of providing healthcare, education, and a clean environment falls on a government that is struggling to provide a minimum of these services.[71]

Powerful social forces are a risk to the orderly rise of the country's standard of living. Workers demand better conditions and higher wages, thus increasing the costs of production. As costs rise, foreign companies are tempted to move to lower wage countries. At the same, farmers from the vast interior of China are attracted to the better living conditions in the cities. The government which has for many years promised economic freedoms at the cost of political freedoms must continue to attract foreign investment. This is a vicious cycle with a built in 'after-burner' effect in that the Chinese Yuan[72] is artificially pegged to the U.S. dollar at a very low exchange rate. This government imposed control means that dollars can be converted to many Yuan, making production costs cheap for American companies. A side effect is that American goods are kept expensive, essentially blocking American companies from the world's largest market. The U.S. has brought action against the CCP in the World Trade Organization (WTO), accusing China of currency manipulation and unfair trade practices. Were the Chinese to allow the RMB to rise in response to supply and demand, the country would most likely experience a deep recession. The resulting social unrest would be seen as a major threat to the regime's stability. The CCP's 'social contract' with the Chinese people is one which is predicated

71 Ibid, pp. 12-A.

72 Also known as the Renminbi, abbreviated RMB, which is a transliteration of "people's money."

on a rising standard of living. Foreign companies are eager to take advantage of cheap labor which the government funds by massive population shifts from the countryside to the manufacturing cities. The burden of providing healthcare, education, and a clean environment falls on a government in which funding for these programs has lagged behind the PLA, urbanization, industrialization, and even the 2008 Olympics.[73] The CCP must manage its domestic spending, providing for a widening social safety net, while spending resources on economic infrastructure and the PLA. Workers demand better conditions and higher wages, thus increasing the costs of production. As costs rise, foreign companies are tempted to move to lower wage countries. At the same, farmers from the vast interior of China are attracted to the better living conditions in the cities. The government which has for many years promised economic freedoms at the cost of political freedoms must continue to attract foreign investment.

After the revolution, social programs were at the bottom of the CCP's priorities. Even after Mao, the reforms of Deng in the 1970s and 1980s were committed to economic growth. What has suffered has been social spending on healthcare, education, and safety nets for the elderly. Yet, in the past sixty years, the government of China has experienced exponential economic growth. China has added about $2 trillion to world GDP, created 120 million new jobs, and pulled four-hundred people out of poverty.

C. CHINESE THIRST FOR OIL

This explosive economic growth has been fueled by the world's economies' dependency on energy, both oil and natural gas (see Figure 9). Soaring energy demand from China will drive the long term oil market[74], while China's natural gas consumption is set to almost triple over the next eight years. *Energy Business Journal* writes that, "China's natural gas consumption was 131.7 billion cubic meters (bcm) in 2011, already a steep rise from the 2000

73 Fowler, G. A. "*China counts the cost," pg* 12-A.

74 *The Economist,* "Keeping it to themselves; Oil Prices," vol. 402, No. 8778 (Mar 31, 2012).

figure of 24.5bcm. However, consumption levels are predicted to soar even higher to reach 375bcm by 2020, thanks to the country's desire to increase share of natural gas in its energy mix."[75]

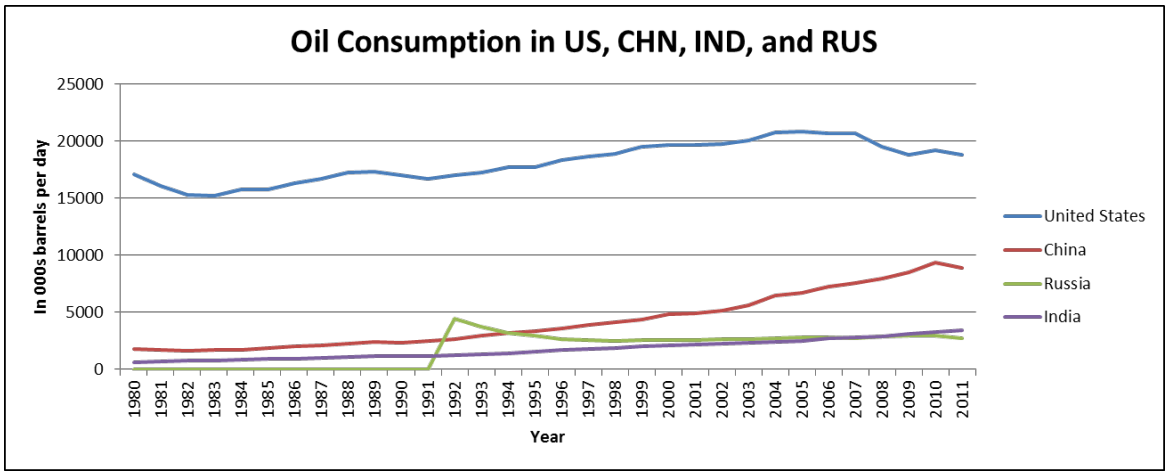

Figure 9. Oil Consumption in the U.S., China, India, and Russia; source, U.S. EIA.

As the rest of the world's appetite for natural resources ramps up and prices rise, China will not be able to purchase energy on the open market so easily and still afford domestic spending. The natural response to tightening supplies will be to seek additional domestic supplies which will not be held hostage to market fluctuations. This is the reason for the Chinese expansion into the South and East China seas, and Africa. This expansion could bring China into conflict with the U.S. First, participation in the market by Chinese firms drives the price energy up, hurting the domestics U.S. economy. Two, the Chinese quest to secure resources via imperialism again reduces the amount of energy available to the market, thus driving up prices, and hurting the U.S. economy.

China is also very active in the Central Asian region, working to bring the oil and gas deposits around the Caspian Sea basin eastward. China has signed contracts with Uzbek, Kazakh and Turkmen companies over Russian giant

75 "Increasing Natural Gas Demand In China," *Energy Business Journal*, Jul 27, 2012.

Gazprom, and Tajikistan's parliament has voted to cede land to China.[76] The Central Asia-China pipeline that is slated to run from Turkmenistan north through Uzbekistan and Kazakhstan, before turning east to China is expected to carry 65 billion cubic meters of natural gas (see Figure 10).[77] China sees Central Asia a critical to the economic growth of its western provinces, and vital to its energy supplies, and Chinese presence is growing.

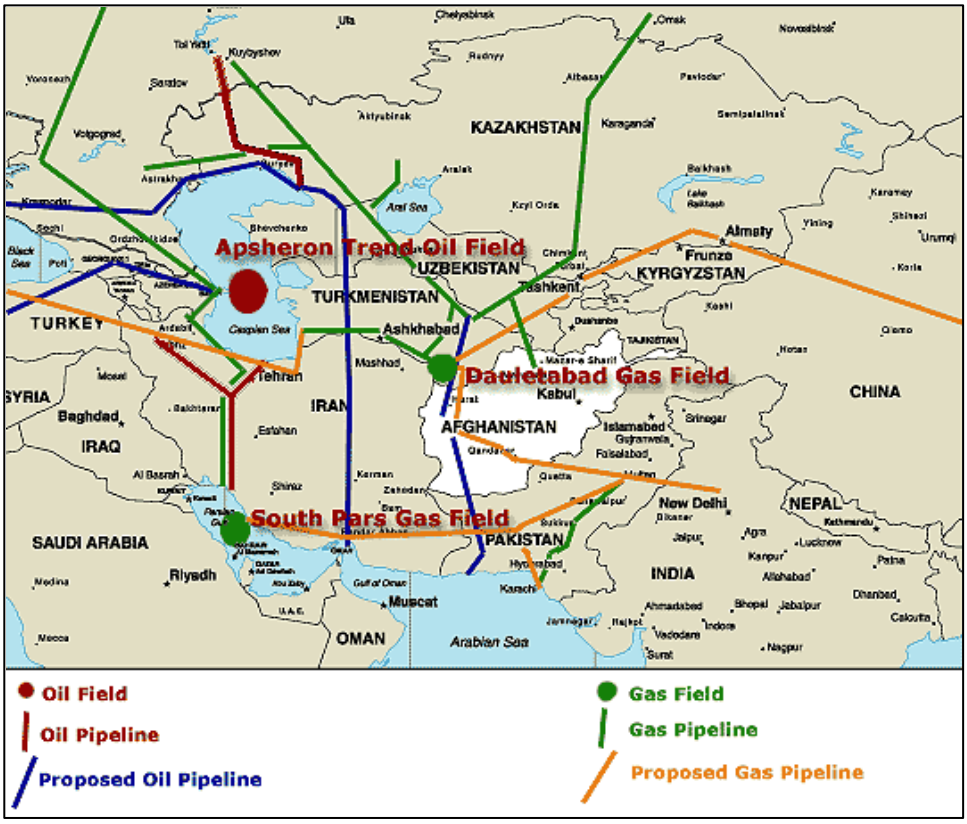

Figure 10. China is ramping up its oil and pipeline construction in Central Asia via the Shanghai Cooperation Organization; from Petroleum Economist.

[76] Foust, Joshua, "Is China Really Moving into Central Asia," *The Atlantic*, Jan 11 2012 online at http://www.theatlantic.com/international/archive/2012/01/is-china-really-moving-into-central-asia/251191/.

[77] Miller, Berkshire, "China's Central Asia Balancing Act," *The Diplomat*, August 6th 2012, found online at http://thediplomat.com/2012/08/06/chinas-delicate-central-asia-balancing-act/.

China's growth will slow after 2025 as its population ages. Right now, China is blessed with a huge working age population, about 70 percent of its total population in 2000, which can easily support dependent children and elderly parents.[78] In 2065, fifty-four percent of the population will be over 60 and only 22 percent will be working unless the government starts providing incentives for people to have large families or opens up to immigration.[79] This would mean there is less to spend on military expansionism and efforts to dominate the resource rich China Sea, as its citizens will force the country to spend more on social programs.

As a developing economy, China has the potential for continued growth, eventually becoming the world's largest GDP. However, without fundamental change in its domestic economic policies, this growth would still be through cheap exports to wealthier countries. Still, the CCP seems intent on managing a steady rise in its domestic GDP at a rate which will surpass the U.S. sometime in 2016.[80] This is important because all of the elements of national power are predicated on national wealth.

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78 Naughton, *Transitions and Growth*, 2007.

79 F. Festini, & M. de Martino,"Twenty five years of the one child family policy in china: Problems and future prospects,"*Journal of Epidemiology and Community Health, vol. 58*, no. 5 (2004): 358–359. See also, Trading Economics country statistics at http://www.tradingeconomics.com/china/age-dependency-ratio-old-percent-of-working-age-population-wb-data.html.

80 International Monetary Fund. Some economists Use a slightly different set of equations with take into account the lower price of some services in China due to the larger labor market. By this method, the Chinese economy is twice as large, and surpassed the U.S. in 2010.

D. CHINESE MILITARY

Figure 11. International Shipping Chokepoints; from U.S. EIA.

Security for the energy that China's economy needs is forcing the country to develop a navy. China became a net importer of oil in 2009, just behind the United States. China has reorganized its state oil industry into two conglomerates. CNPC and CNOOC have become major players across the world, prospecting in Africa, Central Asia and offshore in the South China Seas. With net imports reaching 5.5 million barrels a day, the international oil market is especially sensitive to the larger Chinese economy.[81] More importantly, the Chinese government is especially sensitive to the oil market. A U.S. Government agency, the Energy Information Administration, predicts that 60% of the world's growth in oil demand by 2014 will come from China.[82] Necessarily, government policies are heavily weighted towards protecting this resource.

[81] China Analysis, U.S. Energy Information Administration, 4 September 2012, found at http://www.eia.gov/countries/cab.cfm?fips=CH.

[82] Ibid.

Chokepoints in the international sea lanes are of particular concern (see Figure 11). In 2010, China imported over 50% of its oil from the Middle East. Saudi Arabia and the southern African country of Angola together accounted for 66 percent of its oil imports.[83] Hormuz, in the Persian Gulf, is the world's most important oil chokepoint, with flows through the strait accounting for 35% of all seaborne oil, and 20% of all the world's oil. More than 85% of these crude oil exports went to Asian markets, with Japan, India, South Korea, and China representing the largest shares.[84]

The Strait of Malacca, linking the Indian and Pacific oceans, is the shortest sea route between Persian Gulf suppliers and the Asian markets. Oil shipments through the strait supply China and Indonesia, two of the world's fastest growing economies. It is the key chokepoint in Asia with an estimated 14 million barrels of crude a day transiting the strait.[85] China's energy security currently rests on the might of U.S. and Indian naval flotillas protecting the chokepoints, but the PLAN has been increasing its ability to project naval power.[86]

China is also looking closer to home for more energy (see Figure 12).[87] The South China Sea is conveniently close, but developing those reserves bring its own geo-political difficulties. Estimates for proven and undiscovered oil reserves in the South China Sea range from 28 billion to as high as 213 billion barrels of oil.[88] That is more oil than any other field except Saudi Arabia and Venezuela, and could supply China for more than sixty years.[89] A recent survey

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83 Ibid.

84 U.S. Energy Information Administration, World Oil Transit Chokepoints, 22 August, 2012, found at http://www.eia.gov/countries/regions-topics.cfm?fips=WOTC&trk=p3.

85 Ibid.

86 Ashley Townshend, "Unraveling China's "String of Pearls,"" YaleGlobal, 16 Sep 2011, found at http://yaleglobal.yale.edu/content/unraveling-chinas-string-pearls

87 U.S. Energy Information Administration, ''China,'' May 2011, http://205.254.135.7/ countries/cab.cfm?fips_CH; and ''BP Energy Outlook 2030,'' January 2011, http://www.bp.com/liveassets/bp_Internet/globalbp/globalbp_uk_english/reports_and_.

88 ibid

89 ibid

found that the South China Sea could have almost 4 trillion cubic meters of gas, which could power Chinese consumption for thirty years.[90] Japan, the Philippines, and Vietnam all have conflicting claims in the area, and there have been militarized accidents in the recent past. India is also getting involved, stemming from its close relationship with Vietnam and several claims made by Indian oil companies on leases in the South China Sea.[91]

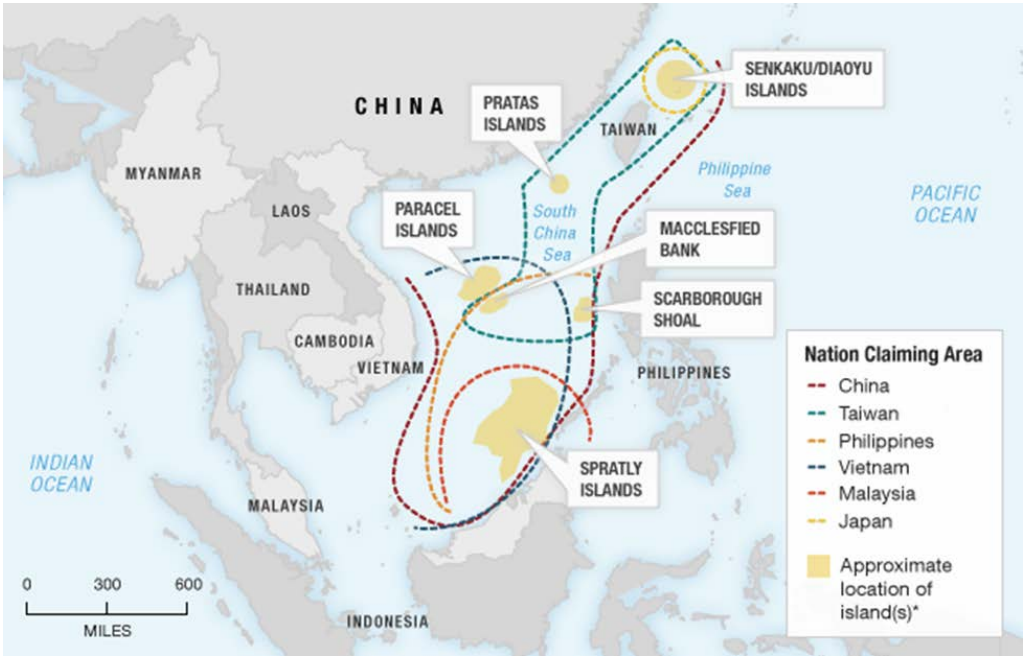

Figure 12. "Nine Dash Map" showing overlapping claims in the South China Seas; from The Economist.

The brewing conflict over the islands of the South China Sea conveniently serves the CCP leadership's goal of creating deeper feelings of commitment in its people towards the state. Taking on Japan and by proxy, the Unites States,

90 U.S.GS, Assessment of Undiscovered Oil and Gas Resources of Southeast Asia, June 2010.

91 Krishnan Ananth, ''South China Sea projects an infringement on sovereignty, says China,'' *The Hindu,* September 19, 2011, http://www.thehindu.com/news/international/article2468317.ece?css_print. Also, Leszek Buszynski, "The South China Sea: Oil, Maritime Claims, and the U.S. China Strategic Rivalry," *The Washington Quarterly*, from the Center for Strategic and International Studies, vol. 35, no. 2: 139–156.

plays well to a domestic audience excited to see China grow as a regional power, getting its way in an area historically considered their own. International laws dictate that a country with sustainable communities on disputed islands has a legitimate claim to those islands.[92] Accordingly, China recently established a larger army garrison and legislature to govern Yongxing Island, more than 200 miles southeast of Hainan. The goal of that move is to allow Beijing to "exercise sovereignty over all land features inside the South China Sea," including more than 40 islands "now occupied illegally" by Vietnam, the Philippines and Malaysia.[93]

The economic boom nurtured in the civilian economy also is enhancing the PLA's military capabilities, as Beijing begins to be able to afford large investments into both defense and civilian projects.[94] In the past decade, military spending has risen ten percent a year, funding projects meant to bring strategic reach to the PLA, particularly the navy and air force.[95] China is heavily dependent on imported energy via pipelines in Central Asia and the sea lanes in the South China seas. The pace of military modernization accelerated during the 1990s in response to moves by Taiwan's leaders to establish the island as an independent sovereign country instead of a part of China.[96] Estimates of the size of China's military spending vary widely because much of that spending is off-budget, but in terms of achieving their goals, Chinese military leaders claim they

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[92] The United Nations convention on the Law of the Sea (1982) states that if a country has a self-sustaining community on an island or reef, not for example, an overnight fishing hut, then that island can be considered part of the territorial land of the that country. As such, the waters extending out twenty-four miles are territorial waters of that country. If China can legitimately claim the islands of the South China Sea, it would have an effective legal claim to all the waters and resources of the South China Sea. The later ASEAN Declaration on the Conduct of Parties in the South China Seas (2002) restates these legal requirements.

[93] Jane Perlez, "China Asserts Sea Claim With Politics and Ships," New York Times, 11 August 2012, U.S. edition online at http://www.nytimes.com/2012/08/12/world/asia/beijing-reasserts-its-claims-in-south-china-sea.html?pagewanted=all.

[94] Tax revenues in China have risen from 10 percent in the early 1990s, to more than 15 percent in 2011.

[95] Perlez, Jane, "Continuing Buildup," 4 Mar 2012.

[96] Shirk, *China: Fragile Superpower* , pg 69.

will have a modern force capable of defeating Taiwan and countering American intervention by 2020.

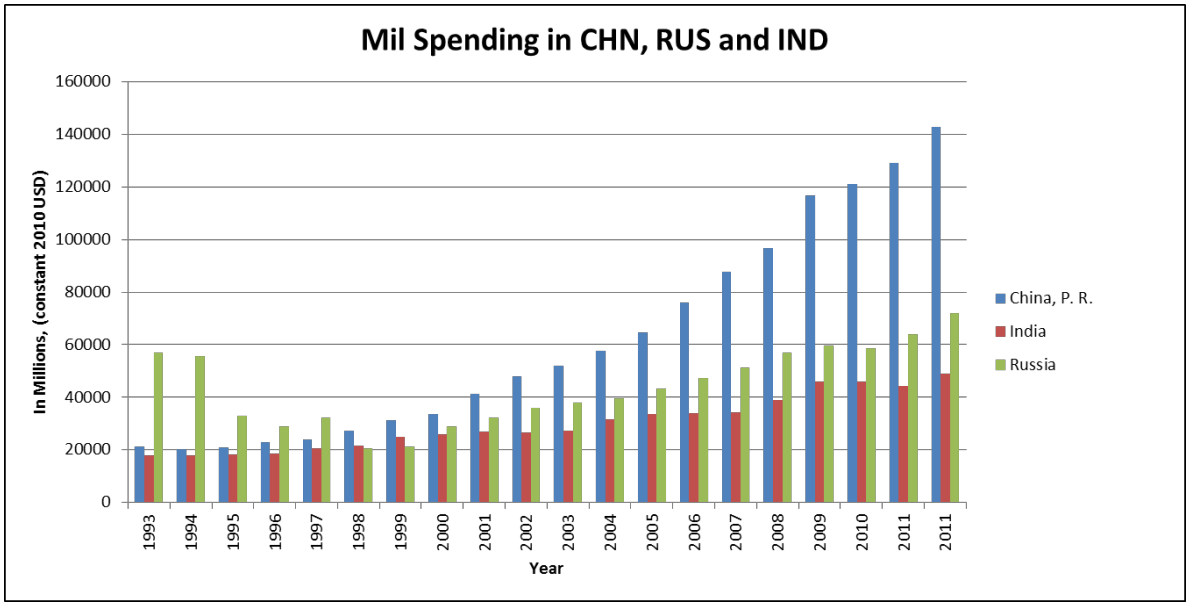

Figure 13. Comparing military spending of China, Russia, and India; source SIPRI.

According to SIPRI, a defense research institute, China's annual defense spending rose from $30 billion in 1990 to almost $130 billion in 2010 (see Figure 13).[97] America still spends four times as much on defense, but on present trends China's defense spending could overtake America's after 2035.[98]

Official defense spending ran at an average of two percent of GDP from 1990, when the earliest good data is available, to 2011.[99] This would be about 100 billion dollars in 2011, but due to the secretive workings of the Central Military Commission, the U.S. DoD thinks the number is even higher, around 170

[97] SIPRI, found at http://www.sipri.org/databases/milex

[98] Economist, 7 APR 2012, "The Dragon's New Teeth," from the print edition, http://www.economist.com/node/21552193.

[99] World Bank, Military Expenditure, found at http://data.worldbank.org/indicator/MS.MIL.XPND.GD.ZS. Also, Bloomberg news (Mar 4, 2012) has a good article on Chinese defense spending at http://www.bloomberg.com/news/2012–03–04/china-says-defense-spending-will-increase-11–2-to-106–4-billion-in-2012.html

billion.[100] Accounts normally open to scrutiny in the West, like research and development, are kept off budget. So while Chinese defense spending has remained steady as a percentage of GDP, it has grown in real dollars, outstripping inflation. If the prices of weapons and technology remain the same, then China is already acquiring a significant ratio of what the U.S. is acquiring. In this light, the DoD estimate is more on the mark, since China, through purchasing other countries weapons systems, doesn't need to invest nearly as much in research and development, leaving more for acquisition.

The Chinese military started from a dreadfully low point. Wild reports put the "people's army" at two-hundred million under arms, but it consisted mostly of conscripted peasant youth eager to escape the hardships of rural life. They wore sneakers and were armed with old and barely working weapons and went into battle armed with the "spiritual atom bomb" of Mao Zedong thought.[101] The number of soldiers was cut almost in half, from 4.5 million in 1981 to 2.5 million today as part of the modernization process.[102] After watching the devastating defeat the U.S. and its allies inflicted on Iraq in 1991, the PLA realized that its huge ground forces were militarily obsolete and is now well on its way to producing a military that has peer capabilities with the United States.[103] Its first phase is now complete, with the modernization of all aspects of training for personnel and weapons. The second phase is ongoing, with an emphasis on command and control, and technologies to tie all its forces together on the modern battlefield. Part of this phase has been the ongoing effort to increase the PLA ability to project its force well beyond it borders. In the short term, the DoD is focused on Chinas area denial/anti-access capabilities, sometimes referred to in literature as AD/A2. The purpose of AD/A2 would be to lock out any U.S. forces sent to respond to Chinese movements against Taiwan,

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100 Perlez, "Continuing Buildup," Mar 4, 2012.

101 Shirk, *Fragile Superpower*, 69.

102 *The Economist*, "The Dragon's New Teeth," April 7th 2012.

103 Ibid.

or any attempts to interfere in shipping through the Malacca strait. In the longer term, China wants to develop the capability to deploy Task Forces into distant lands, and use them as a tool to institute policy.[104] This requires several advances, the chief of which is developing the PLA's separate arms to work together as a joint force. Already, it has undertaken joint training exercises with Russia.[105] The greatest expenditure of funds inside the growing PLA budget goes to the PLA Air Force (PLAAF) and the PLA Navy (PLAN) which reflect the current emphasis on AD/A2 in the Taiwan Strait.[106] The growth in these services budgets also reflect how much further those forces must go to create a truly integrated joint force.

Any conflict in the South China Sea, one of the world's busiest trade routes, would have global repercussions given the $5 trillion in ship-borne trade carried on its waters each year.[107] China is preparing to win any conflict, in order to ensure its own economy does not suffer any long term distress. Three goals have guided the development of Chinese naval capabilities for the past twenty years. The first is to be able to 'seal the battlefield' in the event that Taiwan attempts to declare independence. This means that China would attempt to prevent the deployment of U.S. carrier task forces into the Taiwan Strait, as the U.S. did in 1995–1996. This demonstration of mobile American power has driven the PLAN to invest heavily in its own force projection platforms. The PLAN is also determined to protect China's extended trade routes and energy supplies. Second, deploy a sea-based second-strike nuclear capability in the Western Pacific, which was another lesson learned during the Taiwan crisis of 1995—

104 Dennis Blair, "Military Power Projection in Asia," from *Challenges and Choices: Strategic Asia*, 2008–2009, eds, Ashley Tellis, Mercy Kuo, and Andrew Marble (The National Bureau of Asian Research, Seattle Washington, 2008).

105 *Defense News*, "China, Russia Launch First Joint Naval Exercise," 22 April 2012.

106 For operating concepts and the requirements to upgrade to joint capability, see Cliff, Roger, *Chinese Air Force Employment Concepts in the 21st Century* (RAND Corp, Santa Monica CA 2011). For the focus on Taiwan, Shirk's, *Fragile Superpower*, 2007.

107 Randy Fabi and Chen Aizhu, "Analysis: China unveils oil offensive in South China Sea Squabble," Reuters, 1 Aug 2012, online at http://www.reuters.com/article/2012/08/01/U.S.-southchinasea-china-idU.S.BRE8701LM20120801.

1996.[108] China knows it is several decades away from possessing multiple carriers, much less able to compete against the ten task forces the U.S. supports. It has, however, invested in commercial ports along its sea routes through the Indian Ocean. This long term economic strategy came to be called the 'string of pearls' after a U.S. think-tank report in 2004.[109] China denies any naval use of these ports, but they could be quickly converted for military purposes. They also provide a near complete encirclement of India. Third, China wants to move to an information based C^2 structure that can effectively integrate all three services together in a Chinese version of Air-Sea-Land battle.

The PLA has transformed itself into a professional modern force. Today's PLA has cruise missiles, submarines, fighter jets, guided missile destroyers, an aircraft carrier prototype, and a working cyber warfare capability.[110] According to the Pentagon the PLA is on its way to having capabilities that "pose a credible threat to other modern militaries operating in the region,"[111] and "put regional military balances at risk."[112] The Pentagon also envisions China as the power with "the greatest potential to compete militarily with the U.S."[113]

The growth of China's economy has fueled the transformation of the Chinese military. As a developing economy, China will be able to maintain high

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[108] Leszek Buszynksi, "The South China Sea: Oil, Maritime Claims, and the U.S. China Strategic Rivalry," *The Washington Quarterly*, from the Center for Strategic and International Studies, vol. 35, no. 2: 139–156.

[109] Vivian Yang, "Is China's String of Pearls Real?" *Foreign Policy in Focus*, Asia and Pacific, 28 July 2011, found at http://www.fpif.org/articles/is_chinas_string_of_pearls_real. Also, read Billy Tea, "Unstringing China's Strategic Pearls," Asia Times online, 11 Mar 2011. Finally, Chris Buckley, "China considers Seychelles offer, denies base plan," *Rueters,* U.S. Edition, Dec 13, 2011.

[110] Bryan Krekel, Patton Adams, and George Bakos, "Occupying the Information High Ground: Chinese Capabilities for Computer Network Operations and Cyber Espionage," *U.S. China Economic and Security Review Commission report*, Mar, 2012, found at http://www.uscc.gov/RFP/2012/USCC%20Report_Chinese_CapabilitiesforComputer_NetworkOperationsandCyberEspionage.pdf.

[111] Office of the Secretary of Defense, *The Military Power of the People's Republic of China*, 2005 (Washington, DC, 2005).

[112] Department of Defense, *Quadrennial Defense Review* (February 6 2006) found at http://www.defense.gov/qdr/report/report20060203.pdf

[113] ibid

spend rates on defense budgets for some years to come, at a time when the United States is struggling to pay for its own social programs. National budgets are key indicator of what the state values most through allocations of resources. The priority the state places on its ability to project power or social and political objectives can plainly be seen.[114] In the U.S., balancing social programs and power projection is becoming increasingly difficult. In 2011, the Unites States paid out almost $800 billion in payments to individuals under various social security programs, an amount greater than the U.S. DoD budget. China is approaching the point in which its own spending on social programs must grow, or it will face ever-rising tensions from an aging population.

114 Gilpin, *Political Economy,* 9.

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III. PRESSURE ON THE U.S.

The financial strains that China will be

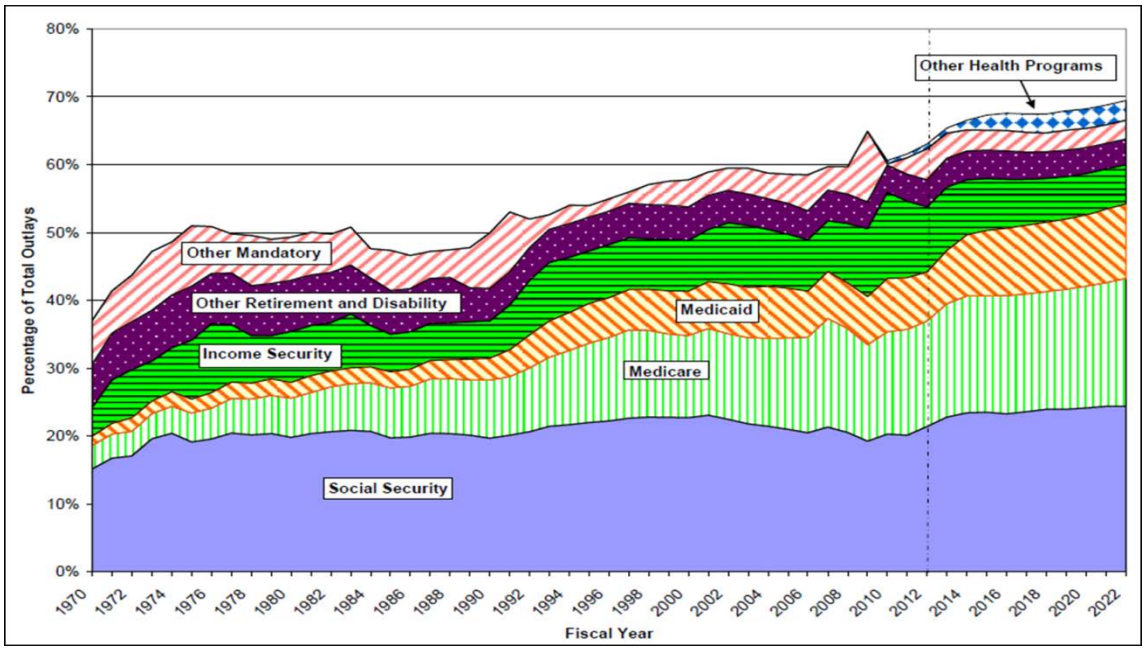

Figure 14. Comparing non-defense mandatory spending; from CRS.

facing in the future are already occurring in the United States. The American social contract, predicated on the pillars of Social Security, Medicare, and Medicaid, are all designed to ensure that the poor and old are not left helpless at the ends of their lives. Unfortunately, the U.S. social security system faces tremendous financial problems as the population is aging.

Outlays for Social Security benefits will jump by $43 billion, or nearly 6 percent this year (see Figure 14). That increase includes the effect of the 3.6 percent cost-of-living adjustment that beneficiaries will receive in January 2013. In addition, the number of Social Security beneficiaries has risen by an estimated 2.5 percent, to 56 million people, in 2012.[115]

[115] http://www.cbo.gov/sites/default/files/cbofiles/attachments/08–22–2012-Update_to_Outlook.pdf.

Mandatory or "entitlement" outlays will increase by 5.1 percent in 2011 and by an average of 4.4 percent annually between 2012 and 2020, compared with an average growth rate of 6.4 percent between 1999 and 2008. They will average 12.3% to 13.3% of the GDP during FY2012 to FY2020.[116] These costs are driven by massive increases in nationalized medical care, Medicare and Medicaid, from around 6% of the GDP to well over 20% -- they rose 5.73% in 2011. Expenditures in the United States on health care surpassed $2.3 trillion in 2008, more than three times the $714 billion spent in 1990, and over eight times the $253 billion spent in 1980. Without major changes in cost, they will equal some 25% of the GDP in 2025.[117]

Even under the CBO's 'alternative fiscal scenario' which incorporates current fiscal policy and widely anticipated changes, government spending will be absorbed by entitlements and interest by 2025. When the CBO did the same calculations in 2000, they determined the critical point when the government could not afford current entitlements was 2060.[118] Total mandatory outlays on entitlements will reach $12 trillion by 2017 yet revenue is only projected to reach four trillion dollars, up from two trillion in 2012.[119] In short, the declining economy and burgeoning mandatory spending on entitlements are creating a situation in which the U.S. will not be able to afford to increase DoD budgets without significantly increasing tax revenue.

A. DISCRETIONARY SPENDING

When the budget crunch comes, the first slice of the pie to be scrutinized is discretionary spending. Already, it is smaller than mandatory spending, which is spending required by law. At around 35% of the budget, discretionary spending funds veteran benefits and the State Department's international affairs and

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116 CBO, http://www.cbo.gov/ftpdocs/108xx/doc10871/Chapter3.shtml.

117 U.S. Census Bureau, Kaiser Family Foundation, *CNN Money*.

118 *The Economist,* The Elephant in the Room, The Economist Online, 7 May 2011.

119 http://www.cbo.gov/sites/default/files/cbofiles/attachments/08–22–2012-Update_to_Outlook.pdf.

diplomacy. Income and health security, which are unemployment benefits and welfare, are also funded here. What really affects long term national defense is the two percent of the discretionary budget that goes towards education and training, and the one percent that funds research and development.[120]

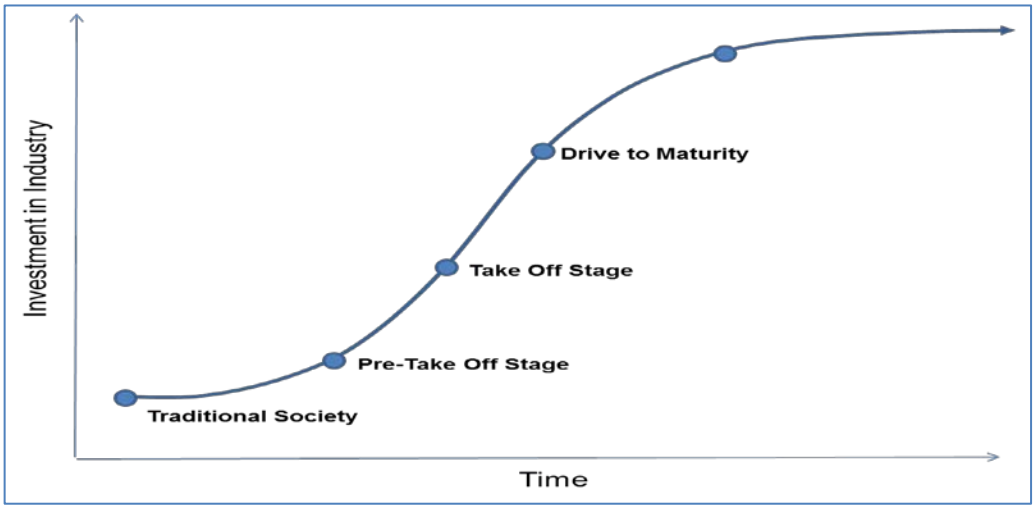

Figure 15. Economic growth speeds up dramatically in the 'take-off' stage, and then slows as it matures. Currently, China is the 'take-off' stage while the U.S. is 'mature' with an expected growth of 2 to 3 percent per year; from Rostow.

As a fully developed economy the U.S. has a much harder task in creating the additional wealth needed to maintain a comfortable margin over the Chinese. Walt Rostow presented a theory of stages of economic growth in the 1950s which still holds true today (see Figure 15).

As economies mature and transition to the final stage of development, the nation turns to offering increased security, welfare, and leisure to the working force and encouraging enlarged private consumption to include the purchase of single family homes and durable consumer goods and services on a mass basis. Many nations, driven by their burgeoning material success and the influence that

[120] See OMB website for the federal budgets and the all-important historical tables. A good reference is the CBO briefs located online at http://www.cbo.gov/publication/42636.

comes from it will also seek a greater measure of power on the international scene.[121] The United States did both. Immediately following the Second World War, America assumed a position of leadership that it continued to pursue as it came to realize the benefits of a global system which it dominated. As living standards rose in the 1960s, Americans engaged in the mass consumption required by Rostow's final stage. The economic boom of that decade was built on the flight to the suburbs, the mass application of personal transportation and everything industry provided. Millions of new homes and thousands of new miles of road were built to get people to and from the places they wanted to be. Billions of dollars of infrastructure improvements were funded by the federal government in order to move goods produced in America to locations all around the world, and vast commitments were made to provide social protections to Americans.[122]

Following the Second World War, the United States became the factory for goods for a world whose economy was in shambles. The great powers of the first half the 20th century were destroyed; Britain, France and Germany were all losers economically, even forcing Britain to shed its empire in the face of economic reality. The U.S. economy kept growing with only two relatively small recessions in the early 1970s and again in the early 1980s, both of which were brought on by global oil shocks. During the 1990s, economic expansion accelerated with unemployment dropping to four percent by 2000, and inflation was kept under three percent. By any standard, the 1990s were an economic golden age.[123]

In the early 2000s, there was a recession as the 'tech' bubble, which had driven wealth accumulation, popped. This was followed by the crashing of the housing market in 2007, leading many Americans to feel that the entire decade had been an economic downturn. The causes of the bubbles and subsequent

121 Walt Rostow, "The Stages of Economic Growth," *The Economic History Review*, New Series," vol. 12, no. 1 (1959):1–16.

122 ibid

123 George Kozmetsky, *The Economic Transformation of the United States, 1950–2000* (Perdue University Press, Perdue, IN, 2005).

crashes are covered in detail in other sources, but do not change the basic calculation that the United States is a mature economy that has progressed through Rostow's phases of growth into a mass consumption society. With the resolution of the conflicts in Iraq and Afghanistan, Americans are looking for savings with which to prop up its social programs, and the DoD budget is squarely in Congress' sights.[124]

The U.S. has moved from an industry dominated economy to one that is dominated by providing services. This move has been fueled by the combination of technology advances with knowledge centric innovations. The central question is whether Schumpeter's explanation of creative destruction[125] remains true: Will the U.S. be able to revolutionize its economy the way it did between 1945 and 2000? Or has it achieved the realization of modernization by finally tying social, economic and political change together? There are some arguments that, as the U.S. loses its comparative advantage in manufacturing and knowledge centric services to the rising third world; it is retrenching into a nationalist economy. Nationalist seek to protect U.S. economic activity through a variety of means, including tariffs and trade wars.[126] All of this has the effect of squeezing U.S. revenues through lower earnings. Combined with the squeeze on research and development supported by declining discretionary spending, this could have a chilling effect on the ability of the U.S. to continue to develop the military systems which dominate the battlefield through superior technology. This brings up a key component to this thesis- can the U.S. afford its uniquely American way of war?

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[124] The Budget Control Act of 2011, usually referred to as 'sequestration' in the media, mandates almost $500 billion dollars of cuts to defense over ten years, as well as additional cuts in domestic spending. For more, see the CBO at http://www.gpo.gov/fdsys/pkg/BILLS-112s365eah/pdf/BILLS-112s365eah.pdf.

[125] Joseph Schumpter, *Capitalism, Socialism and Democracy* (Harper, New York, 1950).

[126] David Engerman, *Staging Growth: Modernization, Development and the Global Cold War* (University of Massachusetts Press, Cambridge, MA 2003).

B. THE U.S. WAY OF WAR

What weighs most heavily on U.S. policy makers is the uniquely American way of war.[127] The connection between a nation's military strategies and society reflects its comparative advantage. Thucydides, writing 2500 years ago about the Peloponnesian War, records that Sparta's army reflected its authoritarian society, while the Athenians, a trading city, was more democratic, as well has concentrating on its navy.[128] Julian Corbett and BH Liddell-Hart both noted that Britain used its powerful navy to bring economic pressure on an enemy, rather than commit large land forces to a theater.[129] Capitalizing on a nation's comparative advantage is the most efficient way to engage in war, but this strategic input evolves slowly over generations of war planning.

Russell Weigley argues that since the success of a similar strategy in the Civil War, the U.S. has pursued wars of annihilation, in which heavy firepower, coupled with increasing technology, destroys the enemy. Weigley noted that the military fosters an attitude of aggression at all levels of war, which, combined with careful planning, is meant to produce a decisive battle, and the belief that maximum effort should be expended to overwhelm the enemy. However, Brian Linn notes that history only supports Weigley's contention if one takes into account how the United States would like to fight its wars. Instead, Linn argues, history shows that most conflicts since the Civil War have been wars of attrition.[130] With Iraq and Afghanistan evolving into long term counter

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127 Russell Weigley, *The American Way of War* (Indiana University Press, Bloomington, IN 1977) and Thomas Mahnken, *Technology and the American Way of War since 1945* (Columbia University Press, New York, 2008). Also, TH Ferhenbach's *This Kind of War* (Brassey's, Washington, DC, 2000) discusses the pivotal changes following the Second World War and the Korean Wars towards heavier use of technology.

128 Thucydides, *The Peloponnesian War*, trans. Rex Warner (Penguin Books, New York, 1972).

129 Julian Corbett, *Principles of Maritime Strategy* (Dover Press, Mineola NY, 2004) and Liddel Hart's *Strategy* (Praeger, New York, 1967).

130 Brian Linn, "The American Way of War Revisited," *Journal of Military History*, vol. 66, no 2:501-533

insurgencies, some authors have even argued that 'small-wars' are a new American Way of War.[131]

If we look at Weigley's assumption, two facts become evident: 1) the United States has successfully waged several wars for unlimited political objectives. The Civil War and World War II were both fought to utterly destroy the enemy in order that the victor could dictate terms. Even during World War I, Pershing argued for continuing the attack until the Germans capitulated, even while President Wilson supported a negotiated settlement. Today, there is a vocal segment of policy makers who advocate the complete destruction of Al Qaida, notwithstanding the difficulties of finding and fixing the terrorists. The second fact is that Americans prefer the clean ending of a fight to the finish, and have tended to see their enemies in terms of absolute evil. Hitler in Germany, Kim Il Sung in Korea, Saddam Hussein in Ira and Slobodan Milosevic in Serbia have all been cast as antithical to American values.[132] Americans are adverse to the idea of limited war- MacArthur was so insistent on total war in Korea, that he was relieved.[133] The long war in Vietnam, fought for limited objectives, contributed to dramatic social upheavals in the United States and fed a strong anti-war group that eventually convinced Congress to cut off funding for the conflict. The standard explanation in explaining the loss of strategic goals in Southeast Asia is the interference from the politicians.[134] The military believed that if they had been able to take the war to the North without restrictions, then they (the U.S) would have won.

The reliance on technology and the belief that better technology can make war clean and short is the other central pillar of this thesis. Starting in World War

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131 Max Boot, *The Savage Wars of Peace: Small Wars and the Rise of American Power*," (Basic Books, New York, 2002).

132 Thomas Mahnken, *Technology and American Way of War Since 1945* (Columbia University Press, New York, 2008).

133 Allen Guttman, *Korea: Cold War and Limited War* (DC Heath, New York, 1972).

134 Stanley Karnow, *Vietnam: A History* (Penguin Books, New York, 1997) and Andrew Krepinivich, *The Army and Vietnam* (Johns Hopkins University Press, Baltimore, MD, 1986).

II with the Manhattan Project, the United States has sought to harness the intellectual power of its scientists to create bigger and better weapons. The inability of the American army to beat its enemies in Vietnam contributed to the development of guided munitions and stealth technology. As the cost of research and development arches ever higher, the military has been content with purchasing less of these modern age wonder weapons. The most recent development has been the introduction of information technology designed to reduce the entire battlefield to easily digestible bits of information, readily available to the commander. Billions of dollars have been spent to create these new digital operation centers. However, while no one doubts the supremacy of U.S. weaponry, and the world was impressed with the U.S. ability to overthrow the Hussein regime, technology has not been able to quell the insurgency in Afghanistan.

Lastly is the U.S. commitment to a powerful offensive force, long seen as the most credible deterrent against strategic threats. This idea that the offensive is paramount runs through all levels of the U.S. military. At the lowest level, the ideology of the offensive is written into Army and Marine field manuals, and inculcated in junior officers as one of the principles of war. At the strategic level, the idea of the offensive becomes transformed into the ability to project military force anywhere in the world. A vast amount of the collective DoD budget over the last seventy years has been committed to overcoming the tyranny of distance. Nuclear powered capital ships allow the Navy to remain afloat for six months at a time, while air refueling allowed B2 stealth bombers to take off from Nebraska, drop ordnance on Serbia, and return. The Army has vast stockpiles and mobility to deploy task forces for years at a time, and the Marine Corps, with its expeditionary mindset, although smaller, carries everything a task force needs to fight for fourteen days without resupply. Having all this ability may actually increase the chance of conflict. Herman Kahn and Thomas Schelling, writing at the beginning of the Cold War, believed that offensive strategies and first strike imperatives could lead states to attack, even in self-defense. This idea of

preemption would be codified long after Schelling's work when President Bush announced his national defense strategy in 2002. Robert Jervis and George Quester have elaborated that offensive capabilities actually lead to war by creating an 'all or nothing' mindset in which states are unsure of each other's intentions and so are forced to act. John Mearsheimer recently developed his Theory of Offensive Realism which ties all this together under the international relations umbrella. Finally, there has been quite a bit of synthesis of this material, most notably by Jack Snyder, Stephen Van Evera, and Jack Levy and James Fearon.[135]

A national myth of offensive superiority has developed since the end of WWII, and, since Vietnam, has been carefully nurtured in order to bolster the morale of the people and the military. This myth is built around a carefully indefinable variable that somehow adds to the hard power of tanks and aircraft. The almost infallible belief in this intangible led to the Powell Doctrine[136] and strategies of dominant conventional forces which seek victory in quick kinetic operations. However, if this intangible were real, then added to the absolute power of the U.S., then final victory in Iraq and Afghanistan, two minor powers,

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[135] For this thesis, the term offensive realism, as realized fully by Mearsheimer, is used to annotate the desire of states to attack in order to secure themselves. The organizational and cognitive theories of decision making which lead to the offensive bias is covered in exhaustive detail (in order of importance) Jack Snyder's *Ideology of the Offensive: Military Decision Making and the Disasters of 1914* (Cornell University Press, 1984) and Stephen Van Evera's Cult of the Offensive and the Origins of the First World War*, International Security*, vol. 28, no. 9 (Summer, 1984) and Causes of War: Power and the Roots of Conflict (Cornell University Press, Ithaca, NY, 1999). Van Evera's "Why Cooperation Failed in 1914," *World Politics*, vol. 38, no. 1 (Oct 1985): 80–117 offers perhaps the best review of the how the interactions of the major powers in 1914 led to an unstoppable chain reaction that led to war. For the best read for the general audience, Barbara Tuchman's *The Guns Of August* (Presidio Press, 1990).

[136] In short, the Powell doctrine holds three tenents: One, that only overwhelming force be considered, and two, only when the entire nation is solidly behind the Use of force, and only when 'vital' national interests are at stake. Read Kenneth Campbell, "Once Burned, Twice Cautious: Explaining the Weinberger-Powell Doctrine, Armed Forces and Society, vol. 24, no. 3 (Apr 1998), and Colin Powell, "Powell's Doctrine, in Powell's Words," *Washington Post*, 7 Oct 2001, pgB02. For skeptics of the Powell doctrine, read Thomas Ricks' "Col Powell's Doctrine on Use of military force is now being questioned by senior U.S. officers," *Wall Street Journal*, 20 August 1995, p A12 and Robert Haddick, "The Long Death of the Powell Doctrine," *Foreign Policy*, March 5, 2010, online edition, and finally, James Armstrong's "From Theory to Practice,"a thesis from the U.S. Army Command and General Staff College, found at http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA536670

would have happened quickly. These two cases alone seem to refute the national myth of invincible military power.

The 'myth of the offensive' and success in conflicts like WWII and the first Gulf War has bred the belief that when the nation goes to war, it goes all in, and nothing less that unconditional defeat is acceptable. The country has created a vast military-industrial complex to support this notion. Embodied most recently as the 'Powell doctrine', it is, however, a false notion, since most conflicts in our history have not ended with our enemies' unconditional defeat. This belief in American exceptionalism, particularly in armed conflict, provides a challenging obstacle to success in IW. Few of our current adversaries can be identified clearly, much less defeated. With this new strategy, the U.S. must accept enemy inaction as a viable objective against the irrational and fanatic.

C. DEFICITS AND THE DOD BUDGET

The U.S. has been involved in two wars in the last decade. The rise in DoD budgets is not just attributable to Iraq and Afghanistan. The DoD's budget's annual growth of 4% from FY 2000 to FY 2010 has been greater than historical GDP growth.[137] This created a bubble in defense funding not entirely to blame on the costs of Iraq and Afghanistan. The rise in U.S. defense spending since 1998 has no precedent in all the years since the Korean War. The DoD budget reached its post-Cold War ebb in 1998: $361.5 billion (2011 U.S.D). Since then it has rebounded to a total of $613 billion – a 70% increase. This includes supplemental funding for Afghanistan, but the portion of the FY12 budget request that is unrelated to contingency operations (the so-called "base budget") is $525 billion, which is almost 50% higher in real terms than in 1998.[138]

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[137] Todd Harrison. *"Analysis of the FY 2012 Defense Budget."* Center for Strategic and Budgetary Assessments. *CSBAonline.org*. (12 Oct 2011) pg11.

[138] Anthony Cordesman, *"The New U.S. Defense Strategy and the Priorities and Changes in the FY2013 Budget,"* CSIS, Jan 30, 2012. See also Carl Conetta*, "The Dynamics of Defense Budget Growth, 1998–2011,"* Conference on Economics and Security: Resourcing National Priorities, Naval War College, Newport, Rhode Island, 2010.

An oft used depiction of defense spending is as a percent of GDP (see Figure 17), but this is somewhat misleading.

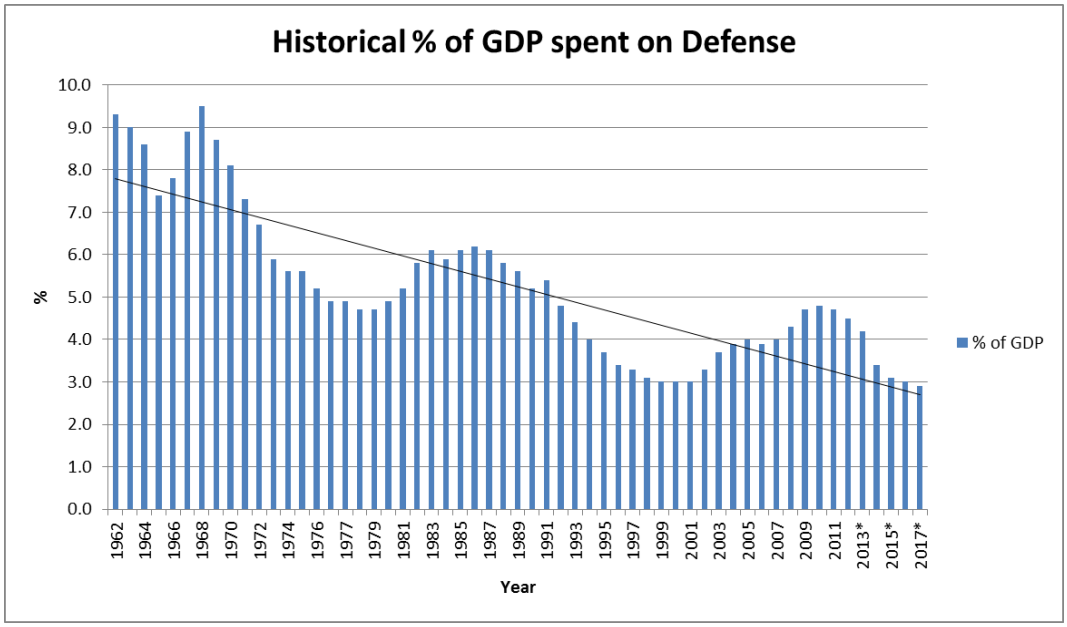

Figure 16. While DOD outlays have declined as a percentage of GDP, the outlays have grown in the federal budget; source, OMB.

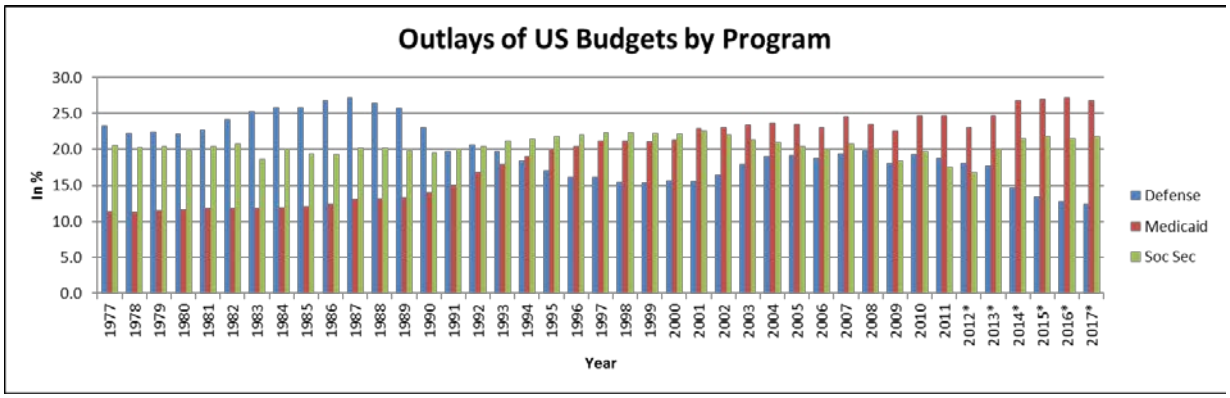

Figure 17. Outlays of federal budget, including Defense and major social programs; source, OMB.

Percentage of GDP does not take into account the nature of the civilian economy or the effects of other government commitments, especially now, as the

U.S. appears to have entered an extended period of economic uncertainty with mounting entitlement requirements which are increasing demands and constraints on federal resources. If one looks at defense spending as a percentage of federal outlays (see Figure 16), then it becomes clear that higher defense spending, and thus capabilities, will have to be funded through much higher taxes.

U.S. military and national security spending already places a far lower burden on the U.S. economy than during the peaceful periods of the Cold War, and existing spending plans will lower that burden in the future. National security spending is now averaging between 4% and 5% of the GDP -- in spite of the fact the U.S. has been fighting two wars in Iraq and Afghanistan -- versus 6–7% during the Cold War. However, at 24.1 percent, total federal outlays in 2010 were considerably higher than the 20.7 percent they have averaged over the past 40 years. According to CBO baseline projections, federal spending in the next decade will average almost 23 percent of GDP.[139] Two other periods have marked exceptional increases over the average: 1958–1968 and 1981 to 1985. The first of these included the Vietnam War (which was the principal cost driver) and then the Reagan effort to expand and transform the force led to increases to the DoD budget that were 43% greater than the average. The Reagan build-up captured recapitalization costs and a small increase in force size, primarily in the Navy. These years saw an increase 57% larger than the average. Notably, the percentage rise in spending during 1998–2008 was nearly as great as both of these previous two surges combined. This comparison illuminates one factor that distinguishes the recent surge: it reflects both the combined effect of a major war and a major effort at force recapitalization.[140]

Extracting the supplemental appropriations meant for the wars, it becomes obvious that the greatest single driver of increases in the 1998–2008 period was personnel accounts, which includes pay and incentives, most notably Tricare.

[139] CBO, http://www.cbo.gov/ftpdocs/108xx/doc10871/Chapter3.shtml.)

[140] Conetta, , *"Defense Budget Growth,* 2010.

During the 20-year period from 1981–2001, budget authority for personnel varied by only a few percent averaging $73,200 (2010 U.S.D) per person. However, between 2001 and 2010, it rose 40%. The increase was sufficient to bring total personnel expenditures back up to Cold War levels.[141]

Personnel costs now consume 45% of the defense budget, totaling $250 billion in FY12. The Defense Health Program (DHP) in particular grew at a real annual rate of 6.3% from FY 2001 to FY 2011[142] but the budget only requests a 1.2 percent increase for DHP, a case in which growth is greater than inflation, but which the budget request doesn't cover. Since FY 2001, overall active-duty end strength has remained relatively flat, hovering around 1.5 million, but the budget now supports a force with essentially the same size and force structure as in FY 2001 at a 35% higher cost.[143] Today, the personnel account is comparable in real terms to that during the Reagan era, although the U.S. military is only 69% as large. Figured on a *per person* basis, personnel costs are 84% higher in real terms than in 1967, when last we were engaged in a large counterinsurgency effort. As noted earlier, present personnel policy ensures that long, exhausting wars will drive personnel costs sharply higher as the military seeks to retain skilled, experienced personnel and attract new recruits. The policy was not designed with labor-intensive slogs in mind. Indeed, it evolved specifically as part of our recoiling from such an effort – the Vietnam War – and its effects.[144]

One component of the new budgetary guidance with conspicuous strategic impact is the decision not to maintain an active-duty Army and Marine Corps large enough to sustain over an extended period the sort of large, manpower-intensive counter-insurgency campaign that has been waged in Iraq and Afghanistan. The Future Years Defense Program is counting on savings coming from eliminating eight of the forty-three active duty brigade combat teams

[141] Conetta, , *"Defense Budget Growth,* 2010.

[142] Harrison, *"FY 2012 Defense Budget,"* 11.

[143] ibid

[144] Conetta, , *"Defense Budget Growth,* 2010.

and six of the Marine Corps forty-one battalion task forces.[145] The efficacy of the argument that numbers of people count less than capabilities rings hollow in the face of the surges of personnel required to implement effective COIN strategies in Iraq and Afghanistan. The argument that we will not engage in extended, personnel-heavy COIN operations, whatever relief the services feel, also flies in the face of the evidence. Major interstate war is declining while intrastate conflict, like the insurgencies in Iraq and Afghanistan, is up. The Uppsala Conflict Data Program (UCDP) shows that since WWII, there have been 372 non-state conflicts, more reminiscent of the Iraq and Afghan insurgencies, than inter-state wars.[146]

The rising costs of sustaining combat power and the 'pivot' of the U.S. national security strategy towards Asia makes the proposed cuts in the Navy the most alarming. Seven cruisers from the Navy's current fleet of 101 surface warships and two of the Navy's thirty amphibious landing ships are scheduled to be decommissioned. Although there had been speculation that the Navy would reduce its number of carriers—currently 11 ships—the budget request for FY2013 includes $608 million of the $11.4 billion estimated cost of a carrier that has been incrementally funded since FY2007. Currently, there are plans to stretch construction of the newest carrier, CVN Ford, over an additional two years to spread the cost over a longer period.[147] This brings down the annual appropriation needed to continue construction, but long term inflationary pressures means this accounting tactic brings an increase in costs all by itself. The life cycle of aircraft carrier procurement, typically the longest of any capital item in the U.S. military's inventory, is indicative of the problem with rising defense cost. A RAND study commissioned by the U.S. Navy on the problems

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[145] Cordesman, *"The New U.S. Defense Strategy,"* 2012.

[146] The Uppsala Conflict Data Program (UCDP) has recorded ongoing violent conflicts since the 1970s. It can be found online at http://www.pcr.uu.se/research/UCDP/

[147] Ronald O'Rourke, *Navy Ford (CVN-78) Class Aircraft Carrier Program: Background and Issues, Congressional Research Service, 20 Feb 2012, found online at* http://assets.opencrs.com/rpts/RS20643_20110420.pdf

associated with manufacturing timelines between the CVN 71 class and the new CVN 78 (Ford) class found that inflation alone could add 1.5 billion dollars to the cost of the a new carrier over the acquisition cycle, typically five years.[148]

The aircraft carrier is the mightiest symbol of American military might. Only ten countries have them at all, and only one, the U.S., has more than two.[149] Nuclear-powered aircraft carriers are the largest, most capable, and most survivable ships in the U.S. Navy. In the mid-1990s, there were 15 aircraft carriers in the Navy fleet; today, there are 11.[150] The Secretary of Defense recently announced plans to shift the Navy aircraft carrier acquisition program to extend, from approximately every four years to five years, the cycle for acquiring a new aircraft carrier.[151] In the long run, this could have the effect of reducing the number of aircraft carriers to ten. The latest generation of carriers, the Ford class, is designed to begin replacing the Nimitz class. The first Nimitz class carrier to be retired will be the Enterprise, which leaves service in 2013 after fifty-two years of service. The cost of the first Ford class carrier will be $13 billion, with $40 billion dedicated for the total program, including R&D, personnel, training, and maintenance.[152] The last Nimitz class carrier commissioned, the George HW Bush, cost about 6.5 billion, higher than the average 4.5 billion for Nimitz class carriers.[153] This reflects some elements of the Ford class being installed on the Bush in a phased transition. In comparison, the U.S.S. Enterprise, the first Nimitz class carrier, costing $450 million in 1962, would be $3.3 billion in 2011 dollars.

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148 John Shank, et al., “Changing Aircraft Carrier Procurement Schedules,” RAND, Santa Monica, CA 2010

149 The UK aircraft carrier Ark Royal will be decommissioned by 2015.

150 Schank, “Aircraft Carrier Procurement Schedules,” 2010.

151 Robert M. Gates, “Opening Statement,” *Military Times*, April 6, 2009.

152 FY12 DoD Budget Request, OMB online at http://www.whitehoUse.gov/omb . See also, http://costofwar.com/publications/2011/analysis-fiscal-year-2012-pentagon-spending-request/ and http://www.popularmechanics.com/technology/military/navy-ships/4321136

153 http://www.fas.org/programs/ssp/man/uswpns/navy/aircraftcarriers/cvn68nimitz.html and http://www.foxnews.com/story/0,2933,479087,00.html

Ultimately, the cost of wars include not only the supplemental appropriations that pay for operations in and around a zone of conflict, but the cost of developing, producing, manning, and equipping the military capabilities needed to execute strategy. For example, since 9/11 Congress has appropriated 1.28 trillion dollars for Iraq, Afghanistan, and other contingencies, the bulk of which has gone to the DoD.[154] Instead, one must incorporate the cost of personnel, recruiting, pay, personnel training, and training for units, as well as the host of other activities often described as 'normal, peacetime activities' of the DoD. Just since 9/11, the annual appropriation to the DoD for these activities, exclusive of supplemental, has averaged just over 500 billion dollars.[155] The total of those budgets, not including 2001, is over 5.2 trillion dollars. Understanding the inflexibility of the U.S. government to gather resources, namely taxes, and the true cost of U.S. military capabilities really brings into focus the high stakes of conflict with China. The PLA is actively developing stand-off capabilities meant to sink U.S. aircraft carriers. The loss of an aircraft carrier represents a huge hole in resource availability, one that would not be replaced in the probable course of a conflict with China.

[154] Ninety-four percent has been expended by the DoD. The other recipients have been the Department of State and Veteran's Affairs. See Amy Balasco, "The Cost of Iraq, Afghanistan, and other Global War on Terror Operations since 9/11," *Congressional Research Service*, March 29, 2011.

[155] OMB, Historical Tables, found at http://www.whitehoUse.gov/omb/budget/Historicals.

IV. WHAT IS NATIONAL POWER?

In order to build a mathematical model using game theory for a conflict between the U.S. and the PRC, cardinal values must be derived that reflect national power. John Mearsheimer defined power as the specific assets and material resources available to a state[156] while others have a more amorphous view of power, determining that 'latent' power rests on the perceptions of one state towards another. Bruce Russett *in World Politics: The Menu for Choice* and William Wohlforth in *The Elusive Balance* maintain that there is a sharp distinction between how policy makers *perceive* the balance of power, and *actual* power. Some advocates of this approach suggest, that power is the sum of a state's interactions within the international system.[157] Geoffrey Blainey argued that war breaks out because states cannot agree on what exactly is the 'balance of power' and the subsequent conflicts create "an orderly ladder of power between victors and losers."[158] In this section, we will analyze and compute the value of material factors, like size of military, production of steel, and energy consumption, in order to predict the outcome of a conflict. This data makes some valid assumptions about national power.

For our purposes, the definition of 'power' is the ability of a nation to produce hard power.[159] This is a function of many factors. Demographic, industrial and military indicators are the most effective measures of a nation's material capabilities. These represent the breadth and depth of the resources that a nation could bring to bear in conflicts. Other factors are not identified in the data with their own stand-alone values like political institutions, citizen education

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156 Mearsheimer, *Great Power Politics*, pg 57.

157 Robert Dahl, "The Concept of Power," *Behavioral Science*, vol. 2, no. 3 (Jul 1957): 202. See also, David Baldwin, *Paradoxes of Power*, Basil Blackwell, New York, 1989 and Karl Deutsche, *The Analysis of International Relations* (Prentice Hall, Englewood NJ, 1988).

158 Geoffrey Blainey, *The Causes of Wars (*New York. Free Press. 1973), 119. See also James Fearon, "Rationalist Explanations for War," *International Organization*, vol. 49, no. 1 (Sum, 1995): 379–414

159 Presumably to exercise and resist influence.

(and competence), regime legitimacy, and the professional competence of the national security elites.[160]

The question of primary strategy in a conflict between the U.S. and PRC shapes how each country would use its power. This nexus of power and strategy has roots that lie deep in the social psychology and cultural norms and values of each society.[161] As discussed earlier in the thesis, the U.S. currently fields a small land force, supported by high technology weapons such as GPS guided missiles, stealth technologies, UAVS and carrier strike groups. Conversely, the PRC can field a large army, but armed only with conventional weapons like tanks, artillery, and older aircraft.[162] However, the PRC is closing the gap at much less cost to itself. Carrier Strike Groups (CSG) provide a good example. The costs to the U.S. since 1945 developing CSG-associated technology and doctrine, along with personnel costs, runs into the trillions of dollars. Instead, the PRC is buying aircraft carriers from third parties, copying U.S. and old Soviet equipment and tactics.[163] This ability to 'free-ride' on the research and development of other nations will lend help to Chinese strategies that rely on high technology and force projection weapons.

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160 J.D. Singer, and Paul Diehl, *Measuring the Correlates of War* (University of Michigan Press, Ann Arbor, MI, 1990).

161 Nesbitt, *The Geography of Thought,* 2003.

162 Anthony Cordesman and Nicholas Yarosh, *Chinese Military Modernization and Force Development*, CSIS, 30 July 2012, and to a lesser extent the OSD report, "Military and Security Developments Involving the People's Republic of China 2012," Annual Report to Congress, May 2012, found at http://www.defense.gov/pubs/pdfs/2012_CMPR_Final.pdf.

163 Ian Story and You Ji, "China's Aircraft Carrier Ambitions: Seeking Truth from Rumors," *Naval War College Review*, Winter 2004, vol. 57, no. 1: 76 and Edward Wong, "China Signals More Interest in Building Aircraft Carrier," *New York Times*, Dec 24, 2008, pg A8 and also Peter Mattis in "In a Fortnight," *China Brief: Journal of Analysis and Information*, vol. 12, no. 19, October 5, 2012.

A. HOW CHINA WOULD FIGHT

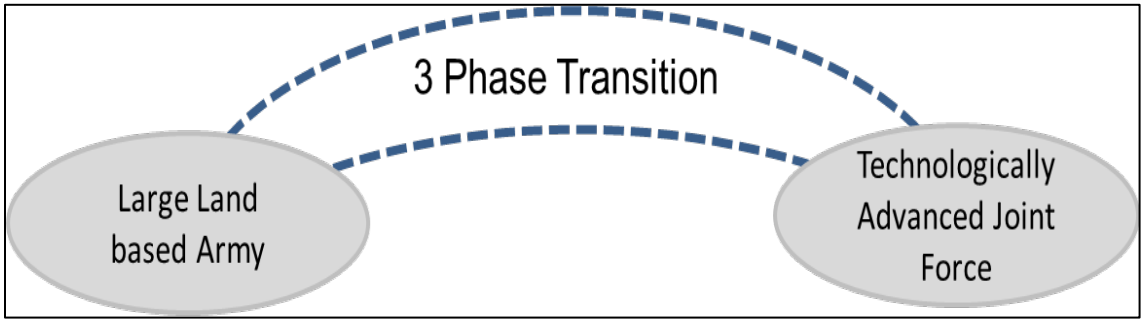

Figure18. The Chinese plan is to transition to a peer competitor of the United States in three phases.

In any future conflict with China, this thesis makes several assumptions. One main assumption is that up to the present, the PRC military strategies are similar to the old Soviet Union's, namely using the preponderance of conventional weapons. Only recently has the PRC begun a transition to strategic weapons capable of providing both matching capabilities against technologically superior adversaries and force projection (see Figure 18). This modernization is occurring in three phases. The first is to upgrade and modernize their equipment; the second is to create an elite, professional force oriented on external threats. To this end, China is developing their ability to deploy and sustain troops around the world, primarily through UN peacekeeping missions and combined training exercises.[164] The third phase is to integrate all their services into a truly capable joint force.[165]

Countries plan to achieve victory using their strengths and maximizing their competitive advantages. Arguing that resources, whether channeled into high or low tech weaponry, are the ultimate arbiter of victory, the strength of the PRC is the massive amounts of simple, effective weapons their huge population can produce. For the purpose of this study, I assume that the Chinese would fight

164 "China and Russia launch Naval exercises," BBC online edition, 22 April 2012 and James Kilner, "Tajikistan hosts China and Russia lead military exercises," The Telegraph, online edition, 6 June 2012.

165 Cordesman "Chinese Military Modernization," 2012.

an attritional strategy that this resource abundance indicates, until a point in the future when their ability to produce high technology weapons meets and surpasses the U.S.

For technologically advanced countries such as the U.S. and the West, there is, sometimes, an inverse relationship between the capability to produce and employ high technology weapons and the ability to sustain an attritional war. Simply put, as economies mature and diversify, they lack the elasticity required to produce expensive, complex replacements for battle losses. In WWII, there was a draftee army given relatively simple tasks with simple weapons for their missions. Today, long training times are required for even the simplest military occupational specialties (MOS).

The choice of strategy, either conventional or strategic, is not esoteric; it is a decision driven by economics. Stealth fighters and Abrams battle tanks are hugely expensive and so are few in number. During the Cold War when it was becoming apparent that the Soviet Union was amassing an insurmountable lead in quantity of equipment, NATO and the West invested heavily in technological advances. Instead of a tank-on-tank battle in central Europe, NATO envisioned an Air-Land battle in which Western tanks swept around the flanks of Soviet armies while aircraft and attack helicopters blunted the main attack. To do this, laser and GPS guidance would ensure that for every missile fired, one Warsaw Pact tank would be destroyed. Combat with Soviet forces would be conducted by numerically inferior ground forces protected by superior air forces. However, by 1990, by skewing its economy to production of military items[166], the Soviets were rapidly closing the technological gap in aircraft. The MiG-25 Foxbat, the MiG-29 Fulcrum, Su-27 Flanker and MiG-31 were considered some of the best aircraft in the world.

166 Direct military spending accounted for 14 to 17% of GNP in 1982. According to Defense Intelligence Agency analysis, Soviet total spending on all military related production was above 30% of GNP, with the CIA analysis somewhat lower. See Franklyn Holzman, “Politics and Guesswork: CIA and DIA Estimates of Soviet Military Spending,” *International Security*, vol. 13, no. 2 (Autumn, 1989):101–131.

The Israeli victories over the Arab armies in 1967 and 1973 are often offered as evidence of technology giving an advantage over dumb steel. However, given the superior training and *élan* of the Israeli Defense Forces (IDF) this tells more about the skill of the Israelis than the inferior quality of the Soviet equipment.[167] The brilliant strategist Edward Luttwak, envisioning a war that never happened, wrote in 1983 that "the habit of comparing the most advanced Western weapons with Soviet weapons already in mass deployment has finally fallen into disrepute. Soviet numerical superiorities must be accepted as superiorities *tout court."*[168] Even a cursory reading of general military histories of World War Two in Europe provide evidence of Luttwak's claim. The American Sherman tanks were lighter skinned, with smaller guns than the massive German Panthers and Tigers, but numerical superiority eventually allowed the mass produced Allied tanks to overwhelm the enemy.[169]

These 'conventional' armaments still define the vast majority of land forces around the world. For another decade at least, it will define the PRC. The inclusion of steel in this study is actually more pertinent given the decline of steel production in most industrialized countries. While the past two decades have seen the first steps of Chinese force projection[170], the PLA lacks any real capability of putting a combat force beyond its contiguous land borders and sustaining that force. While that may change, especially since the PRC seems intent on creating a blue water navy capable of securing sea lanes and projecting

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167 Edward Luttwak*, Grand Strategy of the Soviet Union*, St. Martin's Press, New York, 1983.

168 Ibid, pg 44.

169 Spencer Tucker, *Weapons and Warfare: Tanks* (ABC-CLIO, Santa Barbara, CA, 2004) and Duncan Crow's *Tanks of World War II* (Taylor & Francis, London, 1979).

170 The PRC is the largest contributor of peacekeeping troops to UN missions and staged impressive NEO of Chinese citizens from Libya in 2009. See *Economist*, April 7–14, 2012. Also see the UN High Commissioner's for Refugees report, "China's Growing Role in UN Peacekeeping," *Asia Report N°166,* 17 April 2009, found at http://www.unhcr.org/refworld/pdfid/49ec24ca2.pdf and Daniel Hartnett's "China's First Deployment of Combat Forces to a UN Peacekeeping Mission," *U.S.-China Economic and Security Review Commission,* 13 March 2012, found at http://www.U.S.cc.gov/researchpapers/2012/MEMO-PLA-PKO_final.pdf

airpower over any number of combat areas, for the near future, the PRC seems only able to fight where it can drive and march.

B. THE CORRELATES OF WAR AND MEASURING POWER

At the heart of any science is the compilation of data, and the Correlates of War (COW) Project[171] has been at the forefront of the drive to make the study of international conflict systematic, precise and reliable.[172]

Starting in the 1960s, David Singer began collecting previously compiled data on wars and national power into his own dataset. He felt that much of the preceding analysis was overly simplistic and that the problem of conflict and war needed more systematic and rigorous analysis. Previously, there were three major attempts to gather all the data concerning wars. The first is Pitirim Sorokin's *Social and Cultural Dynamics* (1937) who identified "almost all the known wars"[173] from antiquity to 1925 for the major states in Europe. The second was Quincy Wright's massive *A Study of War*[174] at the University of Chicago. This was a compendium of wars involving either major or minor states in the period 1480–1964. The third was Lewis Fry Richardson's work, completed posthumously, and called the *Statistics of Deadly Quarrels*[175], for the period 1820–1949.

Singer's focus was on the correlates of war, those factors that seemed to be closely connected with each other and associated with the occurrence, duration, and magnitude of wars. The data set on the attributes of war comprised

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171 Housed at the University of Michigan here http://www.correlatesofwar.org/. I primarily Use the National Military Capabilities dataset for this thesis.

172 Other good references in the analytical study of war are AFK Organski and Jacek Kugler, *The War Ledger* (University of Chicago Press, Chicago, 1980). See also, Kugler and William Domke, "Comparing the Strength of Nations*," Comparative Political Studies*, vol. 19, no. 1 (Apr 1986): 39–70 and Kugler and Lemke, Eds, Parity and War: Evaluations and Extensions of the War Ledger (University of Michigan Press, Ann Arbor, MI, 1988).

173 Pitirim A. Sorokin, *Social and Cultural Dynamics* (Porter Sargeant, Boston, 1957)

174 Quincy Wright*, A Study of War* (University of Chicago Press, Chicago, 1942).

175 David O. Wilkinson, *Deadly Quarrels,* from the work of L. Richardson (University of California Press, Berkeley, CA 1980).

only one part of the project, the dependent variable. Understanding the occurrence of war meant obtaining information on other attributes of the international system that theorists had argued were the "causes" of war. Principal among these was power as indicated by national capabilities, which fell in line with the realist theories of international relations.

In this thesis, I use portions of the countries' demographics, as well as industrial and military measures that are used to measure national material capabilities. Other important factors are not included, such as geographical location, terrain or natural resources. Landlocked states would naturally concentrate their military power in land forces, while island or peninsular countries would have larger navies. Geography certainly has an effect on economy. For example, landlocked countries develop trading partners early on, while island states, like Great Britain, must first develop base economic capabilities, and then establish trade and colonies. David Singer and Paul Diehl explained in *Measuring the Correlates of War*[176] that "these facets could enhance or detract from a state's capabilities, but they seem too idiosyncratic, state specific, and dyad-specific to permit valid comparisons across space or time with the attendant changes in technology and culture." Similar arguments are used for other natural resources, like arable land, climate, and availability and there has been some work done on collecting this data.[177] However, the COW rejects this idea because Singer felt that this data would have a "low probability of valid comparison."[178] These data points are, to a considerable extent, subsumed by the factors used. Overall, the COW has produced reasonably intuitive results. It confirms a convergence of the three pairs of indicators when

[176] David Singer , "Reconstructing the Correlates of War Data Set on Material Capabilities of States, 1816–1985," in *Measuring the Correlates of War*, David Singer and Paul Diehl, eds.(University of Michigan Press, Ann Arbor, MI, 1990): 55.

[177] Even a brief list of the most important datasets which contributed to the COW is comprehensive. For a further look at which sets Singer considered most useful, see, Singer and Diehl's *Measuring the Correlates of War* (University of Michigan Press, Ann Arbor, MI, 1990) starting on page 60.

[178] Singer , "Reconstructing the Correlates of War," 55

ranking countries with high material capabilities. This reflects that ‘strong’ states must have a solid balance of all the capability indicators. For Singer, he found that domestic factors such as level of development or elite ideology account for little of variance in state behavior; such cross-national comparisons seem to serve better for mobilizing public opinion than for explaining the conflict behavior and outcomes of the state. He found that such attributes as national capabilities—military, demographic, and industrial—carry the researcher some distance “down the post-dictive road.”[179]

This thesis uses the categories of ‘military personnel’ (MP) and steel production[180] and ‘primary energy consumption’ (PEC) to determine national military capabilities of the nations involved. Steel is important as the primary metal of construction, and not only means more tanks and artillery, but steel production also indicates a strong economy based on vigorous domestic industries. Many economists argue that it is no longer a valid indicator of industrial activity. However, this study concludes that “the downward trend primarily characterizes the manufacture of durable goods and represents the passage from one state of development (heavy industrialization and consumer durables) to another (computers, information processing, and other ‘high technology.’)[181] This would indicate that a decline in the production of steel in advanced economies is made up in PEC, which is then put into advanced consumer goods such as information technology.

179 Ibid, 55.

180 Up to 1890, iron was also included.

181 National Material Capabilities Data documentation, 38.

C. MEASURING CONVENTIONAL POWER

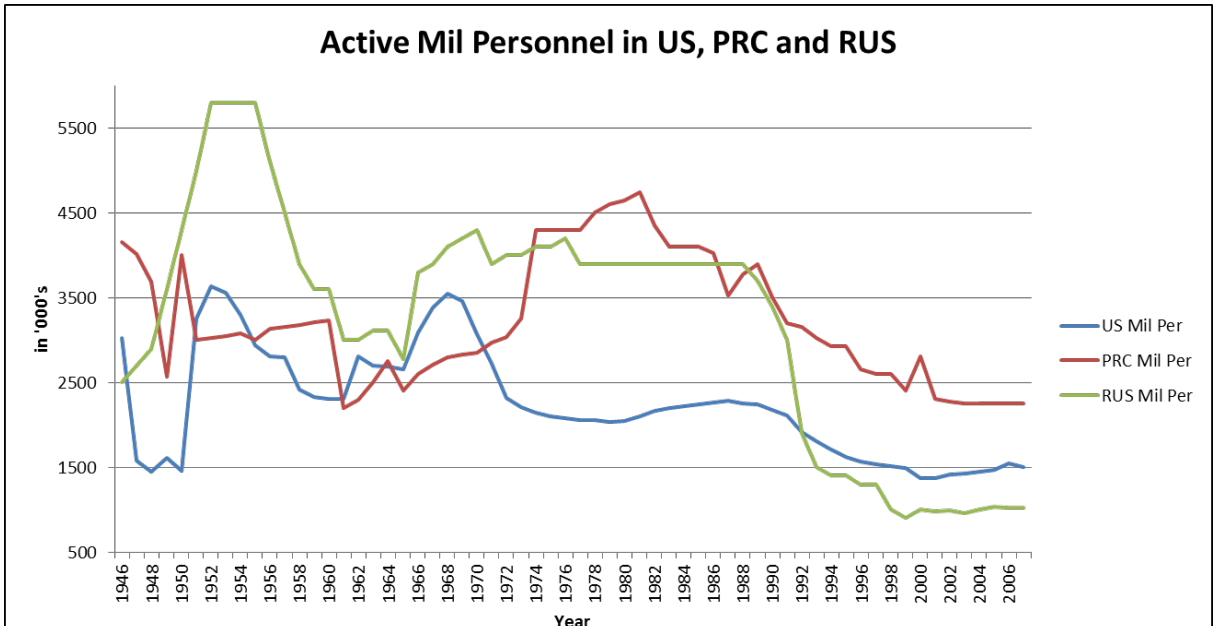

Figure19. Active duty military personnel have been dropp.ing in the all major nations; source COW.

Military personnel are regular, active duty troops under the command of the national government (see Figure 19). This excludes reserves because the mobilization of reserves has a negative effect on industrialization, since those reservists are accounted for as workers in the industrial base first. Military personnel also exclude foreign military forces, semi-autonomous irregulars, and insurgent troops.

Both Mearsheimer and Luttwak stress the importance of heavy industry (of which steel production is a good indicator) to creating a significant land army capability (see Figure 20).

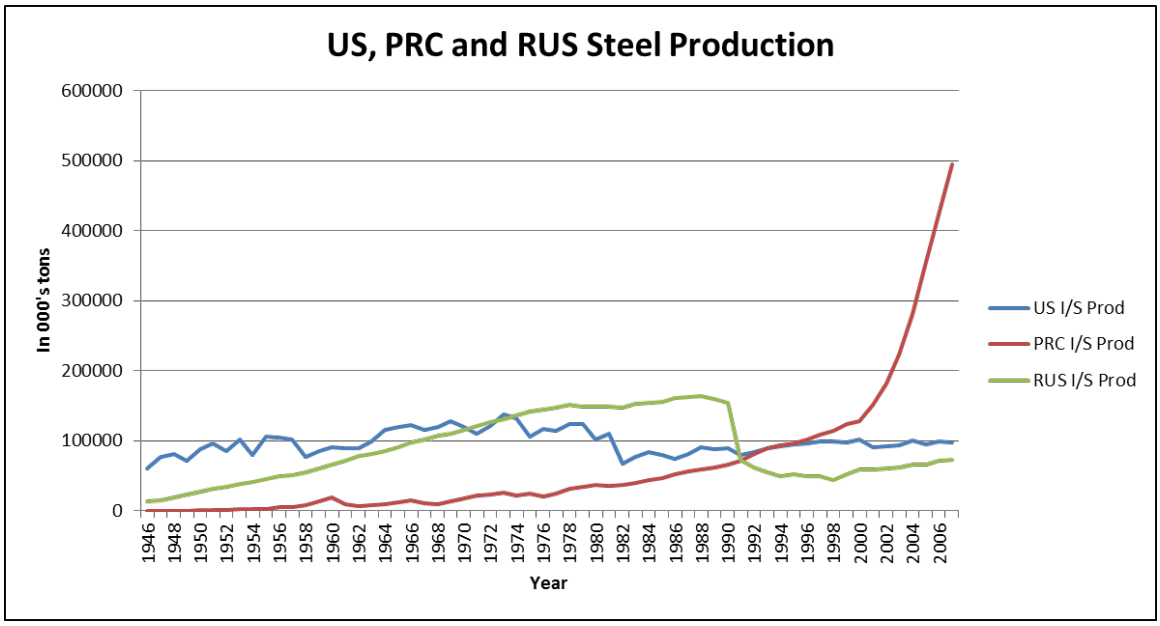

Figure 20. Steel production, a reliable indicator of economic strength, has remained relatively steady in the US and Russia, while China has soared.

For the purposes of this thesis, I have taken steel production and added that raw number to military personnel. This presents the problem of 'adding apples and oranges.' In order to remove this problem and to develop a unit-less composite military capability (CMC), the absolute annual values for each country in the latest year for which data is available (2008) are summed, then converted to a share of the sum of the international system. In the interest of simplicity, I have reduced 'the world' to a manageable population of the ten major countries in the international system, as measured by total GDP.[182] Those countries are the United States, China, Japan, Germany, the UK, Brazil, France, Italy, and Russia. I have also included India. (see Figure 21). Although India was not in the top ten in 2011 (India was number eleven; Canada was number ten), it's physical size, population, and quickly liberalizing market economy makes it too important in the state system to ignore.

182 IMF World Economic Outlook 2011.

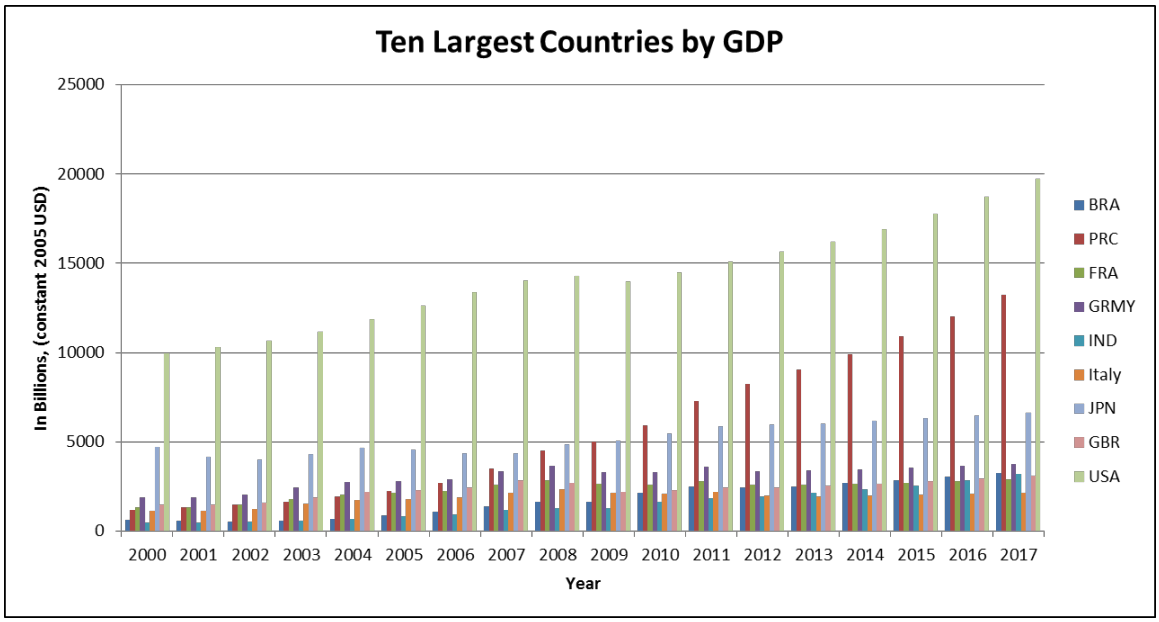

Figure 21. The U.S. has the largest GDP in the world, followed by China, then Japan, Germany; source, IMF.

All the major theorists mentioned in Section One have used total population size as an indicator of potential national power. I did not use total population. While a state with a large population can have a larger army, maintain its home industrial capacity during times of war, and absorb losses easier than a state with a smaller population, I have included this data in primary energy consumption because I have already pulled out the regular military forces, and what is left can be considered as part of the industrial capacity available to the nation. Similarly, urban population has non-material factors which enhance its importance. Societal organization and social services are associated with higher education standards and life expectancies that contribute to higher levels of industrialization and industrial capacity. For these reasons, I am including the categories of total population and urban population into PEC, since energy is a primary product of industrialization.

D. MEASURING STRATEGIC POWER

Primary Energy Consumption (PEC) is substantially the product of all other factors of national industrial capabilities. The greater the energy consumption (and predicated energy production), the larger the potential manufacturing base of an economy. This leads to a larger economy, and subsequently, more wealth. Because the trend in state vs. state requires greater and more complex weapons, PEC can be considered an indicator of high technology weapons. For example, China is rapidly closing the gap between itself and the U.S. in primary energy consumption, indicating that China will soon be able to close the technological gap on which the U.S. has predicated its win scenario versus China in any conflict (see Figure 22).

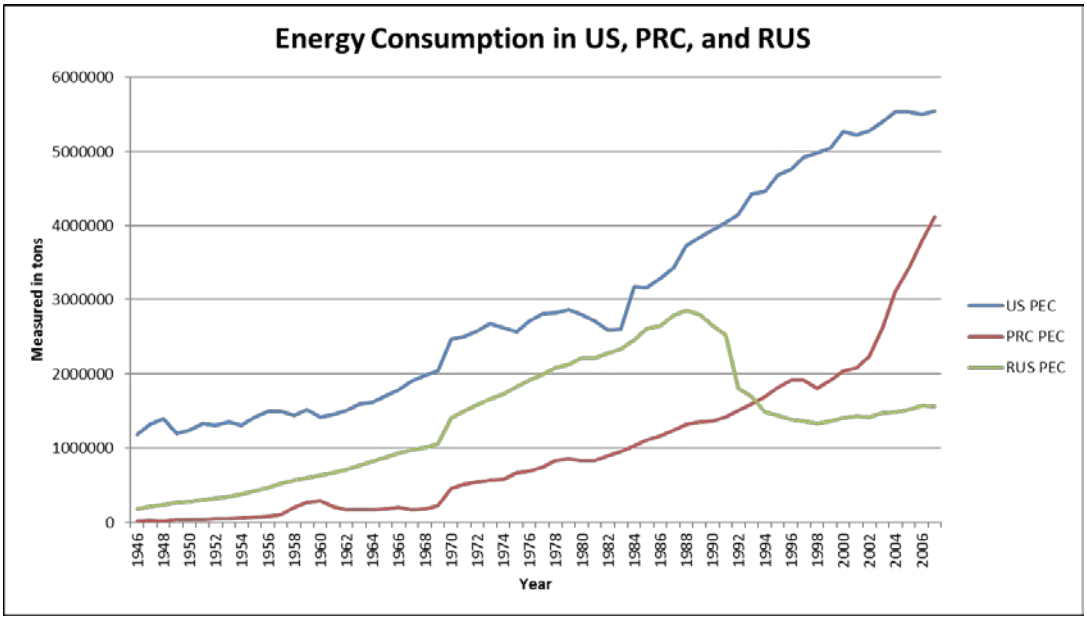

Figure 22. Primary Energy Consumption is used as an indicator of a country to produce the high technology weapons used in strategic warfare; source, COW.

E. STRATEGIC AND LAND WAR PROBABILITIES

For this thesis, in order to build a simple 2 x 2 game, I will divide U.S. and Chinese military strategies into either strategic or conventional. Strategic plans

utilize air power, long range stealth and aircraft carriers, drones and heavy informational warfare, and other 'high technology' systems. The values for PEC derived from the COW are what we use to indicate the ability of the country to develop and produce these systems. In order to develop a probability of a 'win', we can look at previous uses of high technology in armed conflict. Since the advent of flight, there have been sixteen instances of a country attempting to use strategic airpower to coerce another country into a course of action.[183] In seven of these, that effect was achieved.[184] However, in nine cases the strategic bombing failed. In order to bring more clarity to this study, we focus on U.S. air campaigns since 1945. We find that out of seven attempts, air power was successful only three times. Since we assume that strategic bombing encompasses the PEC of a country (above), we can create a rough probability for the success of an air campaign.

U.S. bombs Germany[185] = unsuccessful
U.S. bombs Japan[186] = successful
U.S. bombs North Korea[187] = unsuccessful

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183 Mearsheimer, *The Tragedy of Great Power Politics*, 99. Also, Benjamin Lambeth's *The Transformation of Air Power* (RAND, published in book form by Cornell University Press, Ithaca NY, 2000) describes the arc of airpower, from failure early in Vietnam, to successfully forcing the North Vietnamese back to the negotiating table, to the Air War over Kosovo in 1999.

184 Robert Pape has written long and hard on the effects of airpower. See his *Bombing to Win* (Cornell University Press, Ithaca NY 1996), as well as his numerous journal articles.

185 Conrad Crane, *Bombs, Cities, and Civilians: American Airpower Strategy in World War II* (University Press of Kansas, Lawrence, KS 1993).

186 Michael Sherry, *The Rise of American Air Power: The Creation of Armageddon* (Yale University Press, Cambridge, MA, 198). Also, Bill Gunston, *History of Military Aviation (*London: Hamlyn, 2000) and Edwin Hoyt, *Carrier Wars: Naval Aviation from World War II to the Persian Gulf (*New York,McGraw Hill, 1989) and William Murray, *War in the Air 1914–1945 (*London: Cassell Publishing, 1999). Ronald Spector, *Eagle Against the Sun: The American War with Japan (*New York: Vintage Books, 1985) and David Wegg, *Wings Over the Sea (*New York: Arco Publishing, 1979).

187 James Grahn and Thomas Himes, "Air Power In the Korean War," Air Command and Staff College Air University, DTIC, found at http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA398753 and Conrad Crane, American Airpower Strategy in Korea, 1950–1953 (University Press of Kansas, Lawrence, KS, 2001). Walter Boyne, *Beyond the Wild Blue: A History of the U.S. Air Force 1947–1997 (*New York: St. Martin's Press, 1997) and Conrad Crane, *American Airpower Strategy in Korea 1950–1953* (Lawrence, Kan.: University of Kansas Press, 2000). Robert Futrell, *The United States Air Force in Korea*. Washington, D.C.: Office of Air Force History, 1981 and finally, Dennis Showalter, "The First Jet War." *Military History Quarterly*, (Fall 1996):66–76

U.S. bombs Vietnam (Linebacker)[188] = successful (North Vietnam did return to negotiating a permanent settlement after the air offensive began.)

U.S. bombs Iraq (1991)[189] = unsuccessful

U.S. bombs Serbia[190] = successful

U.S. bombs Afghanistan[191] =unsuccessful

There have been ten wars involving at least one of the great powers (as defined earlier) over the last two centuries. Each time, the land campaigns have proved decisive, even though many had attendant naval or air campaigns. For example, in October of 1805, Lord Nelson and the British fleet won a famous battle at Trafalgar, sinking or capturing 21 of 41 ships of the combined French and Spanish fleets, but that naval defeat had no effect on Napoleon's victory over a combined Prussian and Austrian army at Austerlitz.[192] The result of the U.S. effort in Afghanistan remains unclear. The material factors of the countries involved in this strategy game can be computed from the carefully gathered data in the Correlates of War dataset.[193] Since 1945, the record of land combat has

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188 Mark Clodfelter, *The Limits of Air Power: The American Bombing of North Vietnam*(Free Press, New York, 2006). See also Robert Pape, "Coercive Air Power in the Vietnam," International Security, vol. 15, no. 2 (Autumn, 1990): 103–146. Robert Pape, *Bombing to Win: Air Power and Coercion in War* (Cornell University Press, Itaca, NY, 1996) is a longer dissertation of this article.and Donald Mrozek, *Air Power and the Ground War in Vietnam* (University Press of the Pacific, Honolulu, HI, 1988). Dave Palmer's *Summons of the Trumpet* (Presidio Press, New York, 1995) particularly Chapter 2 on Operation Rolling Thunder provides perspective on the policies behind air power in Vietnam.

189 Richard Hallion, Storm Over Iraq: Air Power and the Gulf War, Smithsonian Books, Washington, DC, 1997 and Eliot Cohen, "The Mystique of Air Power," Foreign Affairs, vol. 73, no. 1 (Jan-Feb 1994): 109–124.

190 Robert Pape, "The True Worth of Air Power*," Foreign Affairs*, vol. 83, no. 2 (MAR/APR 2002): 116–130. For an alternative perspective see Grant Hammond, Myths of the Air War over Serbia, *Aerospace Power Journal,* Winter 2000 and Michael O Beale, *Bombs Over Bosnia: The Role of Airpower in Bosnia-Herzegovina* (Air University Press, 1997) and finally, Martin Andrew, "Revisiting the Lessons of Operation Allied Force," *Air Power Australia Analysis*, 2009, located at http://www.ausairpower.net/APA-2009–04.html

191 The short bombing campaign prior to the introduction of ground troops was unsuccessful in defeating the Taleban, not least because the Taleban did not have any targets of value whose destruction would induce them to leave.

192 Mearsheimer, Great Power Politics, 2001.

193 Correlates of War. http://www.correlatesofwar.org/. Singer, J. David, Stuart Bremer, and John Stuckey. (1972). "Capability Distribution, Uncertainty, and Major Power War, 1820–1965." in Bruce Russett (ed) *Peace, War, and Numbers* (Beverly Hills: Sage): 19–48. Also see Singer, J. David (1987). "Reconstructing the Correlates of War Dataset on Material Capabilities of States, 1816–1985" *International Interactions*, 14: 115–32.

been more mixed. In this case, we will look at both U.S. and Chinese interventions in order to determine the probability of a land win.

1) U.S. in Korea = unsuccessful[194]
2) China in Korea = successful[195]
3) U.S. in Vietnam = unsuccessful[196]
4) Chinese-Soviet border incident (1969)[197] = successful

194 MacArthur's final directive from the United Nations before the Chinese entered the war was to unify the peninsula, hence land operations in Korea can ultimately be deemed to be unsuccessful. See Allen S. Whiting's "China Crosses the Yalu: The Decision to enter the Korean War, (RAND, Santa Monica, CA 1960) Roy Aplleman, *East of Chosin: Entrapment and Breakout in Korea*, 1950 (College Station: Texas A&M University Press, 1987) and also Appleman's *Escaping the Trap: The U.S. Army X Corps in Northeast Korea*, 1950 (College Station: Texas A&M University Press, 1990). Blair, Clay. *The Forgotten War: America in Korea* 1950–53 (New York: Doubleday, 1987) Mossman, Billy C. Ebb and Flow: November 1950-July 1951. *U.S. Army in Korea* (Washington, D.C.: U.S. Army Center of Military History, 1990). Stanton, Shelby. *America's Tenth Legion: X Corps in Korea, 1950* (Novato, Calif.: Presidio Press, 1989).

195 "South to the Naktong, North to the Yalu" (June/November 1950). *U.S. Army in Korea.* (Washington, U.S. Army Center of Military History, 1961). Marshall, S. L. A., *The River and the Gauntlet: November 1950, the Defeat of Eighth Army* (Nashville, Tenn.: Battery Press, 1987). Allen Whiting, "China's Use of Force," *International Security*. vol. 26. no. 3 (Autumn 2001):103–131. George, Alexander, *The Chinese Communist Army in Action: The Korean War and its Aftermath* (Columbia University Press, New York, 1969) and Allen Whiting, *China Crosses The Yalu: The Decision to Enter the Korean War* (Stanford University Press, Stanford CA, 1960). Especially part three of Jian Chen's, *China's Road to the Korean War: The Making of the Sino-American Confrontation* (Columbia University Press, New York, 1994). Finally, Hao Yufan and Zhai Zhilai's, "China's Decision to Enter the Korean War: History Revisited," *The China Quarterly*, vol. 121 (Mar 1990):94–115.

196 While there were only a few tactical defeats of U.S. forces in Vietnam, the fact remains that the U.S. purpose for going to war was to defeat the spread of communism into South Vietnam and as a strategic goal, the U.S. failed to reach it. See Conrad *Crane's Avoiding Vietnam: The U.S. Response to Defeat in Southeast Asia*, Strategic Studies Institute, 2002. One of the first texts which outlined the defeat of U.S. strategy in Vietnam is William Corson's *The Betrayal* (Norton, New York, 1968). The most succinct summary of U.S. failure in Vietnam is George Herring's "America and Vietnam: The Unending War," Foreign Affairs, vol. 104 (1990–1992). Based on first hand interviews, British authors Michael Charlton and Anthony Moncrief wrote a fascinating book, *Many Reasons Why: The American Involvement in Vietnam* (Scholar Press, New York, 1978). Finally, retired Army officer Paul Yingling writes a stinging rebuke of U.S. Generals in Vietnam in his "Failure in Generalship," *Armed Forces Journal*, May, 2007.

5) China in Vietnam[198] (1979) =unsuccessful
6) U.S. in Iraq (1991)[199] =successful
7) U.S. in Afghanistan (2001)[200] = inconclusive (=unsuccessful)
8) U.S. in Iraq (2003)[201] = successful

Since no country prepares, funds, and deploys its military to achieve inconclusive results, as in the cases of Korea and Afghanistan, those conflicts can largely be seen as unsuccessful. In order to determine the probabilities of success, we can find that land campaigns were successful three times, and unsuccessful four times. This ratio produces a value for the probability of a conventional force win in a conflict between the U.S. and China which will be used in the formula to derive total national power.

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[197] There are few synthesized historical documents on the Chinese Soviet border conflict and so primary documents provided much of the background for this assumption. The best repository is the National Security Archive, located at http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB49/. Thomas Robinson provides a succinct summary of the conflict with his "Sino-Soviet Border Dispute: Background, Development and the March 1969 Clashes," *The American Political Science Review*, vol. 66, no. 4 (Dec 1972):1175–1202 and has a slightly longer document which includes a game theory matrix on the Sino-Soviet clash (The Border Negotiations and the Future of Sino-Soviet-American Relations, RAND Corp, Santa Monica CA, 1971, located at http://www.rand.org/pubs/papers/2008/P4661.pdf) and Yang Kuisong, "The Sino Soviet Border Clash of 1969: From Zhenbao Island to Sino-American Rapprochement," *Cold War History*, vol. 1, no. 1 (Aug 2000): 21–52. Colonel (ret.) Donald Marks', "The U.S.SURI River Incident As A Factor in Chinese Foreign Policy," *Air University Review*, Jul-August 1971, found at http://www.airpower.maxwell.af.mil/airchronicles/aureview/1971/jul-aug/marks.html provided perspective on how the clashes affected Chinese perceptions of power.

[198] King V. Chen(1987):China's War With Việt Nam, Hoover Institution Press, Stanford University. 1979, and Allen Whiting, "China's Use of Force," *International Security*, vol. 26. no. 3 (Autumn 2001):103–131, and MacFarquhar, Roderick (1991).

[199] Atkinson, Rick Atkinson, *Crusade: Untold Story of the Persian Gulf War* (Houghton Mifflin, New York, 1993) for an overall picture of the first Gulf War. For more in depth analysis, read Richard Hallion, *Storm Over Iraq* (Smithsonian Institution Press, Washington, DC, 1992) and Michael Knight's *Cradle of Conflict* (Naval Institute Press, Annapolis, MD, 2005).

[200]The original objective in Afghanistan was the defeat of Al Qaeda and the ouster of the Taleban (see President Bush's address to Congress on 20 Sept 2001 at http://www.washingtonpost.com/wp-srv/nation/specials/attacked/transcripts/bus.haddress_092001.html) and the two following references for the decline in the situation on the ground: "The Situation in Afghanistan," Hearing before the Senate Armed Services Committee, 15 Mar 2011, ebook, U.S. GPO, Washington, DC, 2012 and "Countering the threat of failure in Afghanistan," Senate Committee on Foreign Relations, ebook, U.S. GPO, Washington, DC, 2009. There are myriad popular works on the troubles ISAF has in Afghanistan and the 'moving of the goal posts'.

[201] Rick Fawn, *The Iraq War: Causes and Consequences* (Lynne Rienner Publishers, Boulder CO, 2006) and Terrill Andrews, *Strategic Effects of the conflict with Iraq* (Strategic Studies Institute, Carlisle PA, 2003). Also Bob Woodward's *Plan of Attack* (Simon & Schuster, New York, 2004).

F. THE FREE RIDER PROBLEM WITH CHINA

China has been able to significantly reduce its defense expenditures through 'free-riding' weapons and technology research by Western nations.[202] Since the only purpose of power is to secure the state against existential threats, those threats which can destroy the state, the Chinese military must prepare to meet strength with strength. Militaries are imitative, which helps to explain why the Chinese are investing in a nuclear navy, with submarines and their first aircraft carrier. The old Ukrainian carrier *Varyag,* has been refitted in the Chinese port city of Dalian. The Chinese navy has also purchased Russian-developed catapult and arrested recovery technology from the Ukraine. They are also

[202] Michael Horowitz describes this phenomenon on a much wider scale, including non-state actors in this study, *The Diffusion of Military Power* (Princeton University Press, Princeton, NJ 2010).

developing a guided missile capable of destroying ships out to a range of 2400 kilometers.[203]

This strategic, high technology capability has not been tested in actual combat, so the probability of a Chinese strategic win cannot be based on simple ratios of success to failure. However, the probability problem must be addressed. The probability won't be zero, because China has some capability, so we set it at 0.1. This represents a capability and it provides a good starting point for our model of Chinese strategic power, since it logically follows that it will only increase.

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[203] The problem with Chinese companies and state companies reverse engineering western technology, buying the systems outright, and simply stealing them in violation of international trade agreements has a long history. Most notably, the Report of the Select Committee On U.S. National Security And Military/Commercial Concerns With The People's Republic of China found at http://www.gpo.gov/fdsys/pkg/GPO-CRPT-105hrpt851/content-detail.html which was the product of a two year investigation that found China had stolen design and launch data on the U.S.' most advanced nuclear weapons, but also found that the technology theft was not isolated, but was the results of decades of intelligence operations. Also, the Department of Commerce' report, U.S. Commercial Technology Transfers to The People's Republic of China, 1999 found here http://www.bis.doc.gov/defenseindustrialbaseprograms/osies/defmarketresearchrpts/uscommercialtechnologytransferstopeoplesrepofchinafinal.pdf details the long history of Chinese policy which is meant to copy technology from western nations in order to facilitate their own domestic research and development. Other notable reports are Shirley Kan, "China: Possible Missile Technology Transfers from U.S. Satellite Export Policy – Actions and Chronology*, Congressional Research Office(CRS)*, 2001, and another CRS report in 2001 detailing the U.S./PRC aircraft collision over the island of Hainan, found here http://assets.opencrs.com/rpts/RL30946_20011010.pdf indicates that some sensitive electronic surveillance equipment could be reverse engineered. Most disturbingly, however, is the third party sales of advanced missile technology to China, who is rapidly increasing their ability to fight at 'stand-off' range, with long range cruise and anti-air missiles, which, when combined with their nuclear subs and carrier technology could defeat U.S. Sixth fleet interventions in the South China Sea. For more, look at Bussert, James C. Bussert, "China Copies Russian Ship Technology For Use and Profit" *Signal* vol. 62. no. 10 (Jun 2008), 80–83. Clayton, Mark, Top 7 U.S. technologies China, other nations want to steal *The Christian Science Monitor* [Boston, Mass] 04 Nov 2011. Gary Milhollin and Jordan Richie. "What China Didn't Need to Steal," *New York Times* 05 May 1999: 25. Greg Mastel, "The art of the steal: How U.S. technology is getting hijacked--And what we should do about it,"*The Washington Post* 19 Feb 1995: C3. Russia/China: Arms sales pose dilemma for Moscow Oxford Research Daily Brief Service. (Dec 20, 2010). Perrett, Bradley, "Chinese Copies*," Aviation Week & Space Technology* Vol. 165, no. 19 (Nov 13, 2006):44. Edward T. Pound. "Explosive Issue: U.S. Sees New Signs Israel Resells Its Arms To China, South Africa --- A Lack of Export Approvals For Technology Is Found; Missiles, Bombs and Radar --- Israel Denies Any Violations," Wall Street Journal 13 Mar 1992: PAGE A1

G. FORMULAS FOR MODELING

In order to develop values for how the U.S. and PRC would wage war, the following formula could be used, where energy consumption is the predictor of strategic power use but is divided by the amount of emphasis a commander would give that particular type of warfare. For example, a commander would probably not have 100% of a country's PEC available for strategic warfare since PEC also produces televisions, cars, computers and iPads. So an assumption is made by dividing the total PEC by the amount available for military operations, in this case, designated with as weight of effort (W). Similarly, the whole value of Composite Military Capability (CMC), our measure of conventional military power, would not be available due to the competing defense and operational requirements elsewhere. The expected value would then equal the sum of strategic power multiplied by the probability of a strategic win (developed previously above) and conventional power multiplied by the probability of a conventional win. Traditionally in game theory, this may be represented mathematically as (see Figure 23):

$$Ev = \sum_{j=1}^{n} a_{ij} * q_j$$

Figure 23. Expected value

where we are summing the value of the two kinds of power, multiplied by the probability of a win through the use of each kind of power. In other words (see Figure 24)[204]:

[204] Bruce Beuno De Mesquita pioneered the use of rational choice behavior and utility theory in his work The War Trap (Yale University Press, New Haven CT, 1981.)

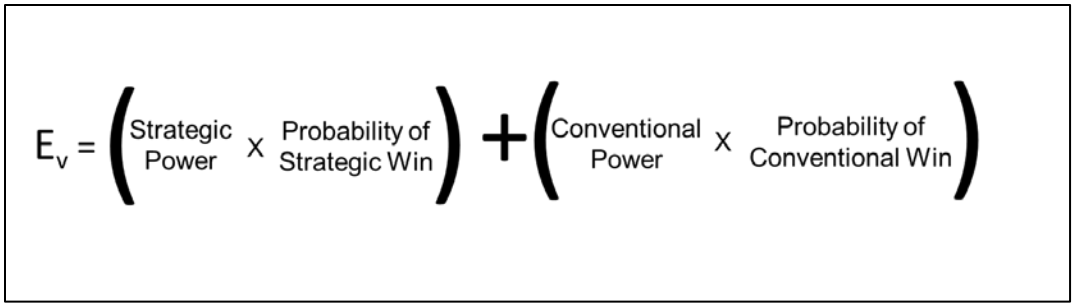


Figure 24. Deriving expected value for modeling U.S./China conflict.

H. CHINA'S MOST DOMINANT STRATEGY

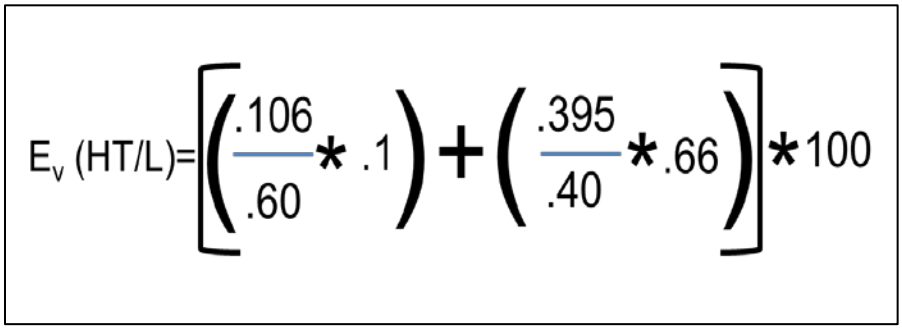


Figure 25. China's most dominant strategy.

In order to determine the value of the PRC military strategies, the values for PEC and CMC are inserted into the model, in this case, the expected value of a strategy that is weighted for high technology, strategic power (HT) at .60 and conventional forces/power (L) at .40, is 66.8 (see Figure 25). This actually will be the PRC's most dominant military strategy. Unlike the U.S., China has not engaged in strategic warfare, so there is no probability of a strategic win which can be applied to China's use of strategic power. However, an application of the 'free-rider' principle would allow it at least a low probability of a win, in this case, a value of .1. The value of the function, 66.8, will be used to game a conflict between the U.S. and China, using these strategies. In our game, we are only using four strategies each. In theory, the formula can be repeated using different values in the sub-components of the formula. At the end this section, following

the game matrix, this will be shown. Other simple strategies for the PRC can also be evaluated. In this case, conventional-only conflict produces a value of the function of 46.0 (see Figure 26). Conversely, a strategy of only high-tech

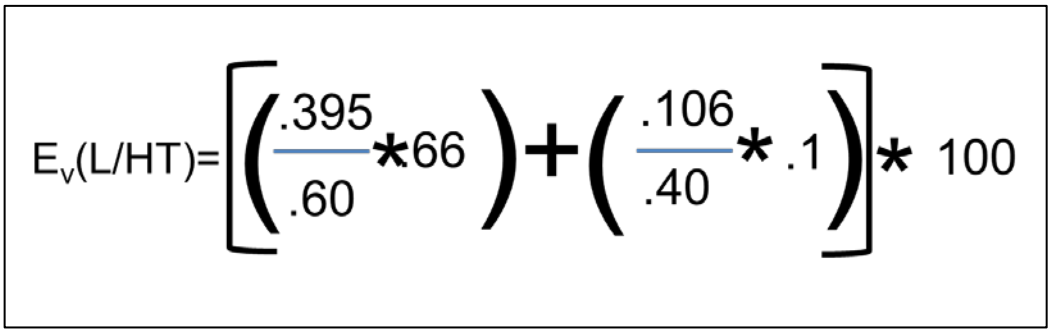


Figure 26. PRC expected value with conventional forces weighted heaviest.

strategic weapons would produce a value of 1.06 (see Figure 26). A strategy which gives a .60 weight to the CMC and .40 to strategic weapons produces a value of 26.07 (see Figure 27).

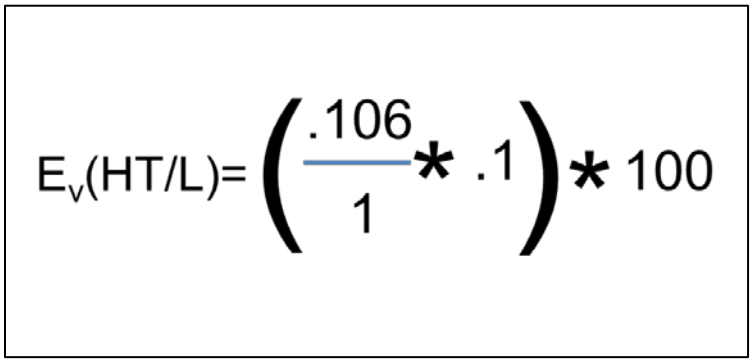


Figure 27. PRC value for a strategic strike only.

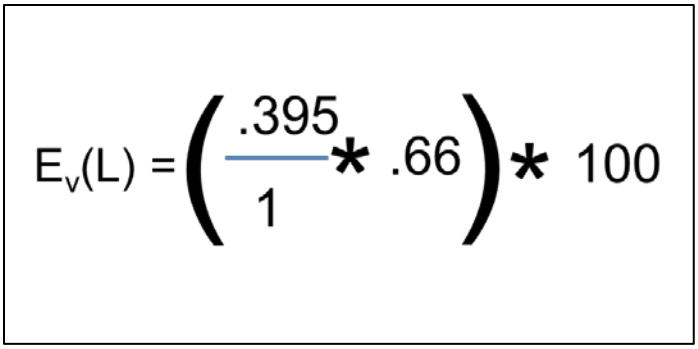


Figure 28. Value of a conventional strike only by the PRC.

I. THE U.S. DOMINANT STRATEGY

For complex economic reasons, the best strategy for the U.S. to follow in *any* conflict would be a surprise, high intensity attack with its strategic weapons. Stealth aircraft, cruise missiles, unmanned drones, both attack and reconnaissance offer the best chance of a decisive, and most importantly, quick knock out. The risk is an air war of longer duration; the losses to these very expensive weapons systems could not be easily replaced. Conversely, a strategy of attrition with a large field army is the worst option. Because of the high cost of the U.S. way of war[205], the military cannot quickly replace losses, either in material or highly trained soldiers, nor can the U.S. economy sustain a long attritional war without converting the economy to ever greater degrees of war

[205] The way the U.S. prefers to fight, relying on technology, heavy firepower, and large massed formations has been well documented in sources like Russel Wiegley's *The American Way of War* (Macmillan, New York, 1973) Richard Locke-Pullan's *U.S. Intervention Policy and Army Innovation: From Vietnam to Iraq* (Routledge, New York, 2006) Thomas Mahnken's *Technology and the American Way of War* (Columbia University Press, New York, 2008) and finally, Jack Snyder's *The Ideology of the Offensive* (Cornell University Press, Ithaca, NY, 1984).

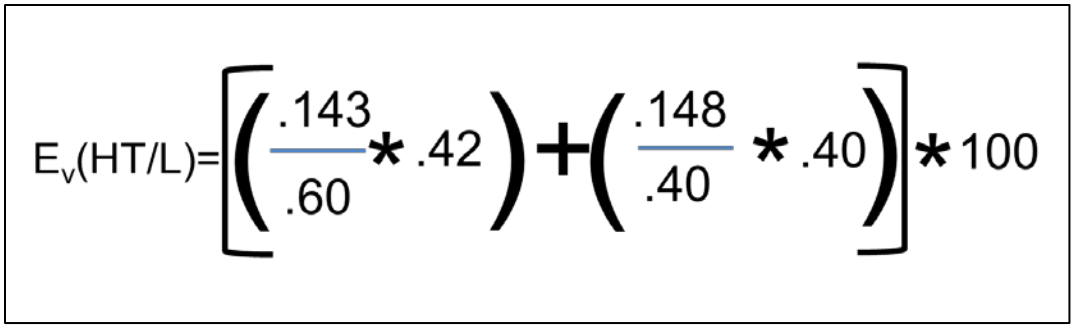
production through government policies, mandates and heavy taxation.[206] U.S. military strategy of conventional forces (L) weighted at .60 and high technology weighted at .40 produces a value of 24.8 (see Figure 28) which is the U.S.' most dominant strategy.

$$E_v(L/HT)=\left[\left(\frac{.148}{.60}*.40\right)+\left(\frac{.143}{.40}*.42\right)\right]*100$$

Figure 29. The US' highest expected value, combining both conventional and strategic military power.

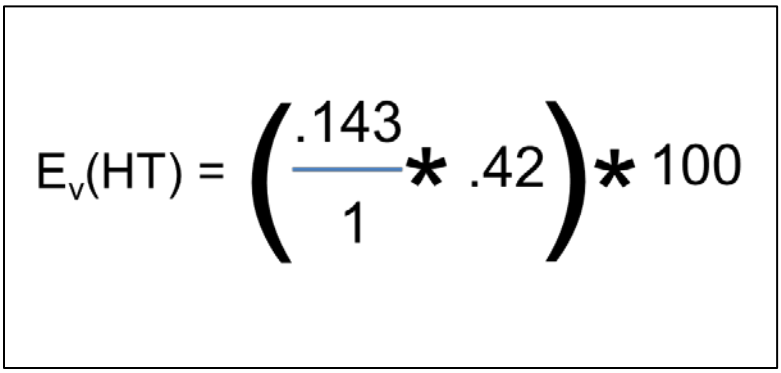
Limiting the conventional and strategic forces (in this model represented as percentages of conventional and strategic power) available to a commander represent very real policy limitations in in modern war. Reversing the weights of effort for the two parts of the strategy, in which land forces are weighted more heavily, produces a value of 24.8 (see figure. 29). U.S. military strategy of high technology (HT) produces an expected value of 6.0 (see Figure 30). A U.S. strategy of only using conventional forces is the least desired military strategy as it produces a value of only 5.92 (see figure. 31).

206 Iraq and Afghanistan, Vietnam. See Richard Lock-Pullan, *U.S. Intervention Policy and Army Innovation: From Vietnam to Iraq* (Routledge, New York, 2006) and this idea springs from the intersection of economics and technology- as the American military develops greater capabilities, those capabilities incur greater costs- to continue with the 'tank' example, a Sherman costs about $400,000, adjusted for inflation, while an M1A2 Abram tank coast about $6 million, but the capabilities have increased- the range of the Sherman's main gun was about 1000 meters while the Abrams has been extended to 2,500 meters, exclusive of new NLOS ammunition. Paul A.C. Koistinen, *Arsenal of World War II: The Political Economy of American Warfare, 1940–1945* (University of Kansas Press, Manhattan, KS, 2004).



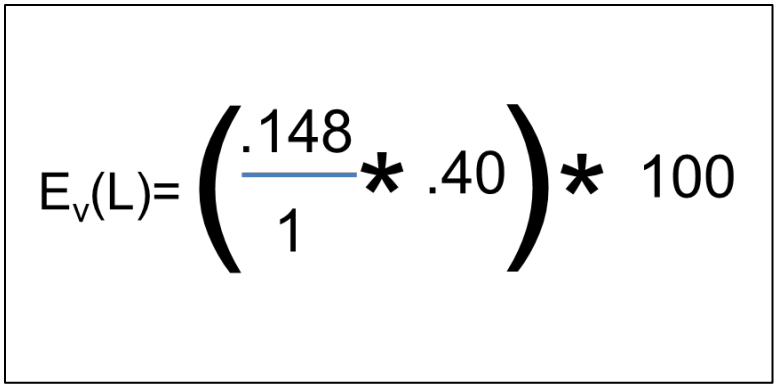
$$E_v(HT/L)=\left[\left(\frac{.143}{.60}*.42\right)+\left(\frac{.148}{.40}*.40\right)\right]*100$$

Figure 30. US expected value weighting strategic systems heavier than conventional forces.



$$E_v(HT) = \left(\frac{.143}{1}*.42\right)*100$$

Figure 31. Value of strategic power for US.



$$E_v(L) = \left(\frac{.148}{1} * .40 \right) * 100$$

Figure 32. Conventional power value for US.

J. STRATEGIES AND COMPETITIVE ADVANTAGES

These simple formulas, derived from the carefully collected COW data provide a single numerical value for each of the four strategies the U.S. or PRC would use in this simplified model. Convert the competitive advantages into strategies in order to construct a simple matrix. According to Mearsheimer and Luttwak[207], significantly higher numbers of military personnel would confer a conventional power advantage, while PEC confers a technology (stealth fighters, GPS missiles, UCAVs) advantage.

The best purely military strategy for the U.S. to follow would be a war in which only high technology weapons were used to fight a strategic war. On the other hand, the PRC has a definite advantage in conventional forces, as indicated by their high CMC. Mathematically, a matrix of strategies would produce a 'pure strategy.' In other words, in a situation defending Taiwan, the U.S. would probably succeed in defeating the PRC. However, if the PRC chose to invade Central Asia with a land army, the U.S. would lose. For example, the time it would take the U.S. to move a land-based JTF into Central Asia would be much longer than the PRC. For the U.S., the best strategy is an all-out strategic war because of the immense advantage, and less risk. I label this strategy

207 Mearsheimer, *Great Power Politics* (Norton, 2001) and Edward Luttwak, *The Grand Strategy of the Soviet Union* (St. Martin's Press, 1983).

U_{44}. U_{33} is the second best strategy is surprise strategic attack with some land forces entering the battle 'in-stride'. The element of surprise is again high, but tempered because of the need for defense of APODs and SPODS close to the areas of potential land campaigns.

A worse strategy is a long build-up period for land forces, with a strategic attack at a pre-determined point, most likely when land combat power reaches a point when the commander feels he could effectively defeat a spoiling attack. However, the long delay in initiating an attack could result in the enemy creating formidable defenses, further reducing the long term viability of conventional forces. Additionally, the larger force and longer lead time increases the costs of the conflict, both in absolute terms and in future economic output. This strategy is labeled $U_{22.}$

The worst strategy for the U.S. is one which uses only conventional power. This strategy is labeled U_{11} and represents a strategy of attrition, in which the initial elements of surprise (strategic attack) and shock (land attack) are lost. Because of the high cost of the U.S. way of war, the military cannot quickly replace losses, either in material or highly trained soldiers, nor can the U.S. economy sustain a long attritional war. Therefore, $U_{44} > U_{33} > U_{22} > U_{11.}$

For China, the best strategy is one in which its competitive advantage can be fully brought to bear, which is an all land forces strategy, labeled here as P_{11}. The opposite of the reasons why the U.S. cannot fight a long war, China can field and sustain a large land army. The next best strategy for China is to fight a land war, with only a little weight of effort given to strategic weapons, labeled P_{22}. Next is a strategic war with some land power, P_{33}. The worst strategy for China to use is an all-out strategic war, P_{44}. Therefore, $P_{11} > P_{22} > P_{33} > P_{44.}$

Placed in a game matrix, the variables would produce the following outcome: each country is in a Nash Equilibrium, a position in which no player can benefit by departing unilaterally from its strategy (see Figure 32). In grand terms, both countries are in stalemate. Replacing the variables with the values derived from the formulas produces the same result (see Figure 33):

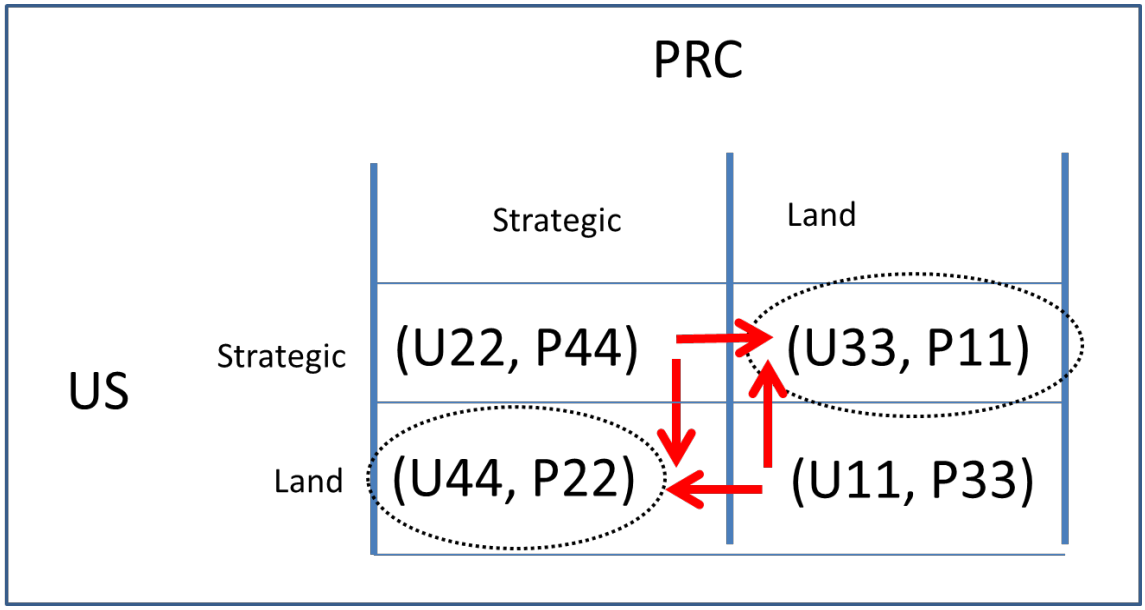


Figure 33. 2x2 matrix showing two Nash equilibria.

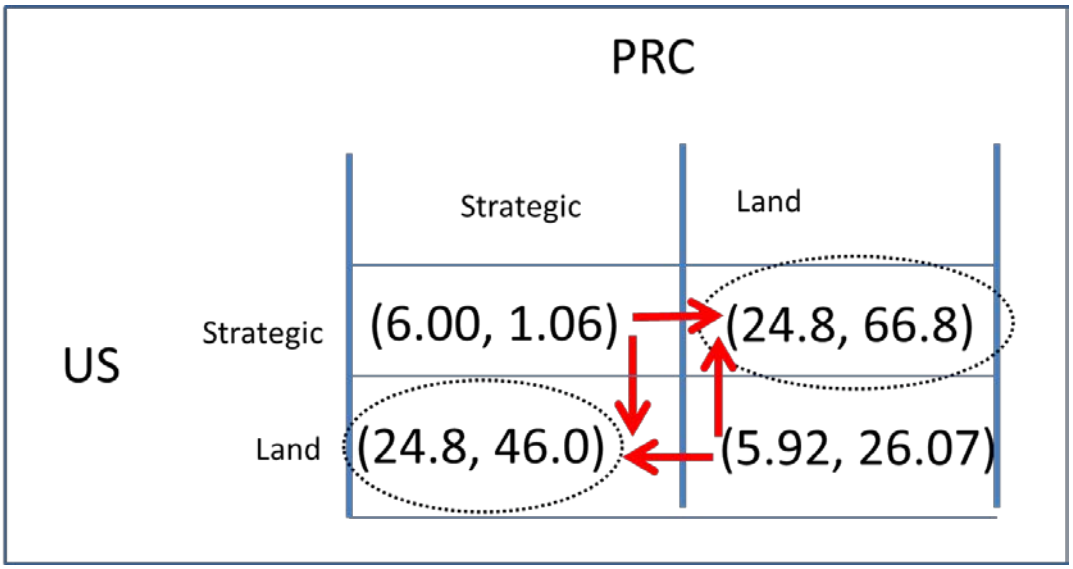


Figure 34. Matrix with values for strategies inserted, showing the same Nash equilibriums.

The values circled in the matrix are 'Nash equilibriums.'[208] A Nash equilibrium in a game matrix results when the strategy value is the best the protagonist can achieve in relation to the antagonist's move. The players, in this case both the U.S. and China, will not willingly move from this position. Most commonly modeled as the 'chicken' game, in international relations, a war following this model would be a 'total' war, in which a loss is perceived as an existential threat. In history, power transition wars which follow this type of model have produced some of the most violent conflicts imaginable. Rome destroyed Carthage and sowed salt on the Carthaginian fields, and the war on the eastern

[208] Named for the Nobel prize winning mathematician John Nash, made popular in the movie, *"A Beautiful Mind,"* Twentieth Century Fox, 2003.

front between Germany and the Soviet Union was depicted by both sides as against sub-humans, people seen as not fit to live.[209]

K. MOVING OFF THE PARETO OPTIMAL

Plotting their relative positions on a graph is another way to visually depict the outcome of the game. In this case, the two countries' Nash Equilibriums lie on what is known as a Pareto Optimal (see Figure 34). According to Straffin, an outcome of a game is non-Pareto-optimal if there is another outcome which would give both player's equal to or higher payoffs. An outcome is Pareto Optimal if there is no such other outcome.[210]

From this Pareto Optimal line, two possible outcomes can occur and both were found to be Nash equilibriums. For two points to both be solutions they need to be interchangeable and equivalent and these points are not. China and the U.S. can move off their Nash equilibriums through economic development, hyper-militarization, and other means. For example, the U.S. could invest heavily in conventional power, in the hopes of producing a dominant strategy, or China could invest in strategic power, in an effort to defeat the U.S. with that strategy. For the reasons mentioned in Sections Two and Three, the only plausible outcome is an increasingly strategic power oriented China.

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[209] Antony Beevor, *The Fall of Berlin* (Viking, New York, 2002) and Beevor's *Stalingrad*, Penguin (New York, 1999). Geoffrey Megargee, *War of Annihilation: Combat and Genocide on the Eastern Front, 1941*(Rowan & Littlefield, New York, 2005) and Alex Kay (et al*), Nazi Policy on the Eastern Front, 1941: Total War, Genocide* (University of Rochester Press, Rochester, NY, 2012). For an intimate first had account of the life of a soldier on the eastern front, read Guy Sajer, *The Forgotten Soldier* (Potomac Books, Washington, DC, 1971).

[210] Philip Straffin, Game Theory and Strategy, 5th Edition (Mathematical Association of America, Washington, DC, 1993).

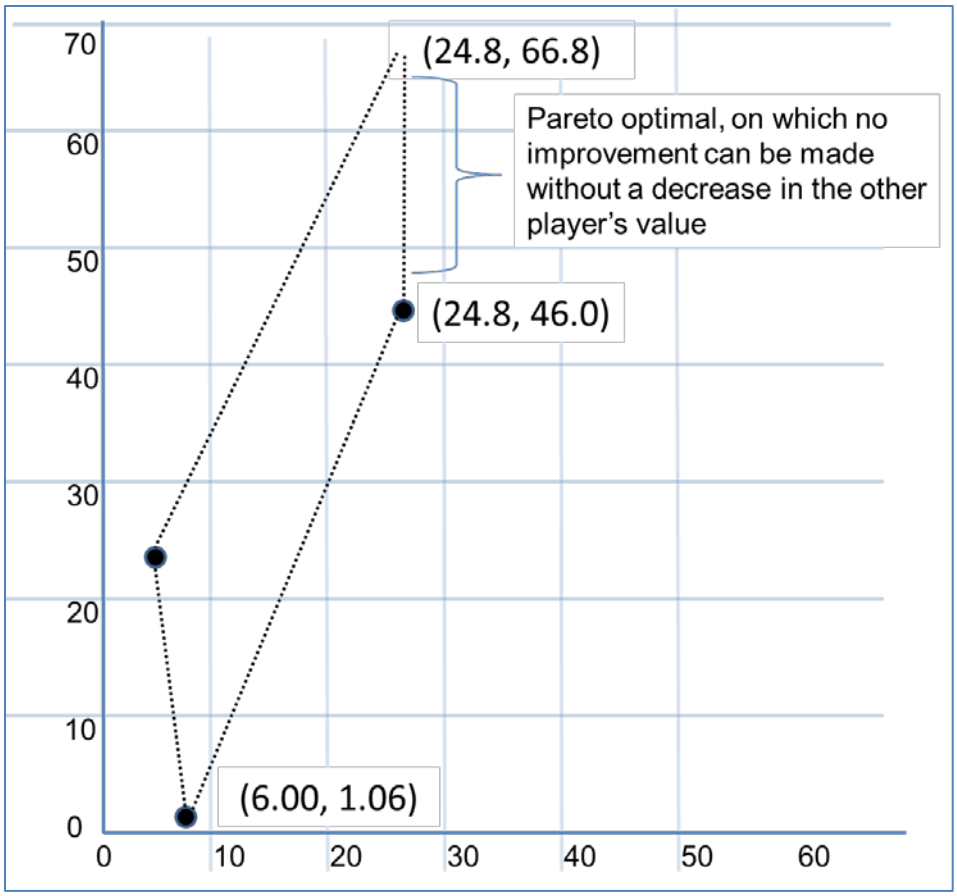

Figure 35. Graphing the values used in the matrix can visually reveal a balance of power between the U.S. and China. As rational states, each would want to move is positions away from the Nash Equilibriums and to the northeast of the graph.

As China increases its ability to project power through a nuclear, aircraft carrier-centered navy, through development of stealth technology and efficient information dominance networks, it will move its 'dot' to the right of its plotted position (see Figure 35). In the graph, both the U.S. and China are very narrowly on a Pareto optimal, in which no player has an advantage over the other. However, it is easy to see that with China on its current economic and development trajectory, it does not have to travel far to achieve a completely dominant position.

L. ADDING IRREGULAR WAR

For reasons explained in Section Two, it will not be as easy to 'move the dot' for the U.S. Resources for greater capability and more high technology weapons, in this case money, are growing scarce. The U.S. must look for other ways to increase its power. Irregular war, in the form of direct action, or indirect support to insurgencies, etc, can provide a way to increase U.S. power against China. There are several reasons that make irregular activities, overt and covert, attractive. Because of the risk of total war, great powers utilize coalitions and surrogates for several reasons: 1) it helps them maintain or advance their power position in their hierarchy in order to preserve economic privileges without risk of total war. 2) it helps them induce uncertainty in order to deter strategic competitors and preserve their economic privileges without the risk of total war, and 3) it helps them counter strategic competitors when confrontation through conventional means is politically or strategically undesirable.[211] The U.S. will seek to minimize its risk by spreading that risk across coalitions, but because side payments (in the form of economic and military aid to bring the partner up to a higher level of military capability) will differ to each possible coalition member, the U.S. will seek to create the strongest coalition with the minimum number of partners still capable of defeating China. Likewise, Arreguin-Toft and Mack[212] have focused on the power inequality as forcing the challenger to adopt irregular actions. This is very important because power in the international state system is imitative, that is, nations will inevitably commit resources in order to develop similar systems as their perceived enemies.[213] Kenneth Waltz noted in in his

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211 Essentially, I forward the idea that irregular actions, both covert and overt, is a strategy to minimize risk taking, explained by Prospect Theory. See Rose McDermott's *Risk Taking in International Politics: Prospect Theory in American Foreign Policy* (University of Michigan Press, Ann Arbor, MI, 1998) where the author also discusses some of the irregular actions listed above.

212 Ivan Arrequin-Toft, "How the Weak Win Wars: A Theory of Asymmetric Conflict," International Security, vol. 26, no. 1 (Summer 2001):93–128 and Andrew Mack, "Why Big Nations Lose Small Wars: The Politics of Asymmetric Conflict," World Politics, vol. 27 no. 2 (Jan 1975):175–200.

213 Michael Horowitz, *The Diffusion of Military Power* (Princeton University Press, Princeton NJ, 2010).

Theory of International Politics[214] that "competition produces a tendency towards the sameness of the competitors… so the weapons of major contenders, and even their strategies begin to look the same all over the world." Chariots in the dim past, the spread of massed formations, the horse, archery, armor have all been copied in an interesting application of Bayes Theorem. Arms races are the inevitable result. The British gained an empire with their unmatched naval power, and before the First World War, Germany followed with a massive naval build-up. Suspicion of each other followed with tragic results. Hitler may or may not have wanted war, but her certainly wanted a powerful military, and in the U.S.' own recent past, it went 'toe to toe' with the Soviet Union. Victory in the Cold War may have sown the seeds for the current 'Asian pivot' against China.

Conventional and strategic power as presented for this thesis is imitative, with each country attempting to win by producing more, or 'better' weapons systems. Nations feel their own security is increased with a bulky, in depth national defense because they can never be sure of another nation's intentions. States must assume that all weapons have an offensive capability, and whether the threat is perceived or real, nations must then be prepared to meet armed force with armed force. This, despite the evidence that irregular war, defined as force used asymmetrically (in ways that have not been prepared for) against conventional power,[215] or forces used in irregular ways against conventional power have a large mitigating effect against of conventional strength. It then follows that an asymmetric capability is an irregular capability, but not all irregular activities are asymmetric.[216] For example, the use of submarines by Germany in the First World War was asymmetric and irregular at the time, but by World War

214 Waltz, *International Politics*, 127.

215 From here, I drop the 'game-ism' of separating power into conventional and strategic elements. More traditionally, all military power is conventional power.

216 Rather than conducting an exhausting review of all the literature which attempts to describe asymmetry and irregular war, I use as my basis the DoD definition which says 'asymmetric' is the application of dissimilar... methods to circumvent or negate an opponent's strengths and 'irregular war' seeks influence over a… population… and favors indirect and asymmetric approaches… but may use the full range of military capabilities. See Joint Pub 1–02, Washington, DC, 8 Nov 2010.

II, it had become an accepted part of regular warfare. In this sense, then, there is an arc to asymmetry. New methods and capabilities when introduced are asymmetric but once they are widely adopted and methods for countering them are developed, they become very regular. Mounted archers, strategic bombing, machines guns, UAVs and stealth have all had outsized impacts on conflict when introduced, but have since entered the regular arsenals of countries.[217]

Irregular activities are simpler to comprehend. While some asymmetric capabilities have been introduced in irregular applications, most irregular war is simply a change of substance and objective from regular war. For example, while conventional war emphasizes speed and mass and firepower, irregular war puts a premium on persistence, low-visibility, and when needed, relative superiority.[218] Irregular warfare often requires special skills, which in a way can be considered asymmetric, especially when employed against conventional forces. However, the key to identifying irregular war is, when taken with the principles above, is the application of direct or indirect force against an objective when it is unexpected and for which no defenses have been planned. The great raids, some of which are discussed below, fall into this category.

The U.S. record with irregular war achieving strategic goals is mixed, not least because some of the counter-insurgency campaigns have timelines reflected in decades. However, enough of a record exists to build a fairly defensible ratio of success to failure. This ratio will provide the probability of success used above. They are:

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[217] In an ongoing demonstration of my proposal that power is imitative, check China's development of a stealth capable figurehter at http://www.washingtonpost.com/blogs/worldviews/wp/2012/11/01/first-video-of-chinas-new-stealth-figurehter/ and at *Jane's Defence Weekly*, 31 Oct, 2012. It is called the Shen Fei.

[218] William McCraven, *Spec Ops: Case Studies in Special Operations* (Presidio Press, New York, 1996).

Son Tay Raid – unsuccessful[219] (The raid was a tactically brilliant, but the strategic goal of recovering the POWs was not attained.)

Desert One – unsuccessful[220]

El Salvador – successful[221]

Somalia 1993 – unsuccessful[222]

Afghanistan Phase One (2001–2002) – successful[223]

Colombia – successful[224]

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[219] For all the Uses of irregular action, begin with Richard *Grimmet's Instances of Use of United States Armed Forces Abroad, 1798–2009*, Congressional Research Service, Jan 27th 2010. I have assigned a value of 'unsuccessful' to the Son Tay Raid since its objective was to recover prisoners of war and at the time of the raid, the POWs had been moved. Even though the tactical execution of the raid was almost perfect, it did not achieve its objective. Read also John Gargus.' *The Son Tay Raid: American POWs in Vietnam Were Not Forgotten,* (AM University Press, College Station, TX, 2007).

[220] Charles Kamps, "Operation Eagle Claw," *Air & Space Power Journal*, found online at http://www.airpower.maxwell.af.mil/apjinternational/apj-s/2006/3tri06/kampseng.html , and Mark Bowden, The Desert One Debacle," *The Atlantic*, May 2006, online edition. Also Charles Cogan has a well researched article using many primary sources, "Desert One and its Disorders," *The Journal of Military History*, vol. 67, no. 1 (Jan 2003): 201–216, and the PBS video "Jimmy Carter" found at http://www.pbs.org/wgbh/americanexperience/films/carter/player/ is a solid report on the strategic implications of the hostage situation and the preparation for the attempted rescue.

[221] Charles Cale, "The United States Military Advisory Group in El Salvador," U.S. Army Professional Writing Collection, Leavenworth KS and Becca Smith's Civil Affairs in El Salvador, Grenada, and Panama, *Center for Strategic and International Studies*, Jan 28, 2009, found online at http://csis.org/publication/civil-affairs-el-salvador-grenada-and-panama

[222] Walter Clarke, and Jeffrey Herbst, editors, *Learning from Somalia: The Lessons of Armed Humanitarian Intervention* (Westview Press Boulder, CO, 1997). Prestowitz, Clyde, *Rogue Nation: American Unilateralism and the Failure of Good Intentions* (Basic Books, New York, 2003). Stevenson, Jonathan, *Losing Mogadishu: Testing U.S. Policy in Somalia* (Naval Institute Press, Annapolis, MD, 1995). For the best tactical account of the battle of October 3rd and 4th, read Sangvic, Roger, *Battle of Mogadishu: Anatomy of a Failure*, School of Advanced Military Studies, U.S. Army Command and General Staff College, 1998, found at http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA366316 and of course, Mark Bowden's *Black Hawk Down*.

[223] It is too soon to find solidly researched articles on the success and failure of of U.S. operations in Afghanistan, but there are several which together give a fairly accurate picture of the first phase of actions in Afghanistan. They are Linda Robinson's Masters of Chaos, Public Affairs, New York, 2004 and G. Herrings Army War College monograph, "The War In Afghanistan," U.S. Army War College, DTIC located at http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA420140. The Congressional Research Service (CRS) has provided multiple reports on progress in Afghanistan, beginning in June 2002 and taken together provide a clear picture of successes and setbacks there. Also Carl Conetta's "Strange Victory," Project on Defense Alternatives, 30 January 2002 was one of the earliest accounts of the abrupt success in Afghanistan, found herehttp://129.11.76.45/papers/pmt/exhibits/703/0201strangevic.pdf. Sean Maloney, "Conceptualizing the War in Afghanistan," *Small Wars & Insurgencies*, vol. 18, no. 1,(2007), 27–44. For a counter point, read David Rohde's and David Sanger's "How the Good War in Afghanistan Went Bad," *New York Times*, Aug 12, 2007.

Bin Laden Raid – successful[225]
Somalia Hostage Rescue – Successful[226]
Philippines – successful[227]

There have been six successful applications of irregular war since 1970, the year of the Son Tay Raid, and three that were unsuccessful. It is no coincidence that the unsuccessful IW applications occurred early. As the United States devoted more resources to building irregular warfare capabilities, the efficiency of those abilities increased, along with a higher success rate.

Imagine irregular warfare capabilities as occupying a set, *c*. The U.S.' sum of those capabilities would be:

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[224] Russel Crandall, *Driven by Drugs* (Lynn Rienner Publishers, Boulder CO, 2002) and an published m/s by Bruce Bagley, "Drug Trafficking, Political Violence, and U.S. policy in Colombia in the 1990s," dated January 2001 are the best places to begin understanding U.S. involvement in Colombia. The CRS report "Colombia: Issues for Congress," by June Beittel, Mar 18, 2011 is excellent as well. Unfortunately, much of the military support provided by the U.S. to Colombia remains classified.

[225] The best sources for information on the Bin Laden raid are Nicholas Schmidle, " Getting Bin Laden," *The New Yorker*, August 8th 2011 and the CBS News documentary, "Killing bin Laden," which aired Sept 9, 2012.

[226] Julian Barnes, "Navy SEALs Rescue Hostages in Somalia," *Wall Street Journal*, online edition, 26 January 2012.

[227] Similar to military operations in Colombia and elsewhere, much information is classified. The best open source is are semi-government publications like Andrew Feickert, "U.S. Military Operations in the GWOT: Philippines, *CRS*, 20 January 2006, and Thomas Lun, "The Republic of the Philipp.ines and U.S. Interests*," CRS*, 3 January 2011 and Bruce Vaughn, et al., "Terrorism in Southeast Asia," CRS, 16 October 2009. Also Tom Shanker, "U.S. Military to stay in Philippines, *New York Times*, online edition, 20 AugU.S.t 2009 and Donna Miles, "Task Force Promotes Philipp.ine Military Capability," *DefenseNews,* 18 July 2012. For Abu Sayyaf, read Zachary Abuza's "Balik-Terrorism: The Return of Abu Sayyaf," *Strategic Studies Institute*, Carlisle Barracks, PA, September 2005, found at http://www.strategicstudiesinstitute.army.mil/pdffiles/pub625.pdf. Raymond Bonner and Carlos Conde, "U.S. and Philippines join forces to pursue terrorist leader," *New York Times*, July 23, 2005,James Hookway, "Terror figure scores in Philippines," *Wall Street Journal Asia*, June 20, 2007.

$$\sum_{i=1}^{x} c_i(p_s)$$

where *c* is the capability and *x* is the number of capabilities multiplied by the probability of success. The new value of the U.S.' power would be:

$$U_p(\beta)$$

where *p* is the highest value of national power determined previously and **β** is the sum of U.S. irregular warfare capabilities. Adding this value will produce a higher value for national power, thus moving the U.S.' position on the graph to the right, which will be a more dominant position against China (see Figure 36).

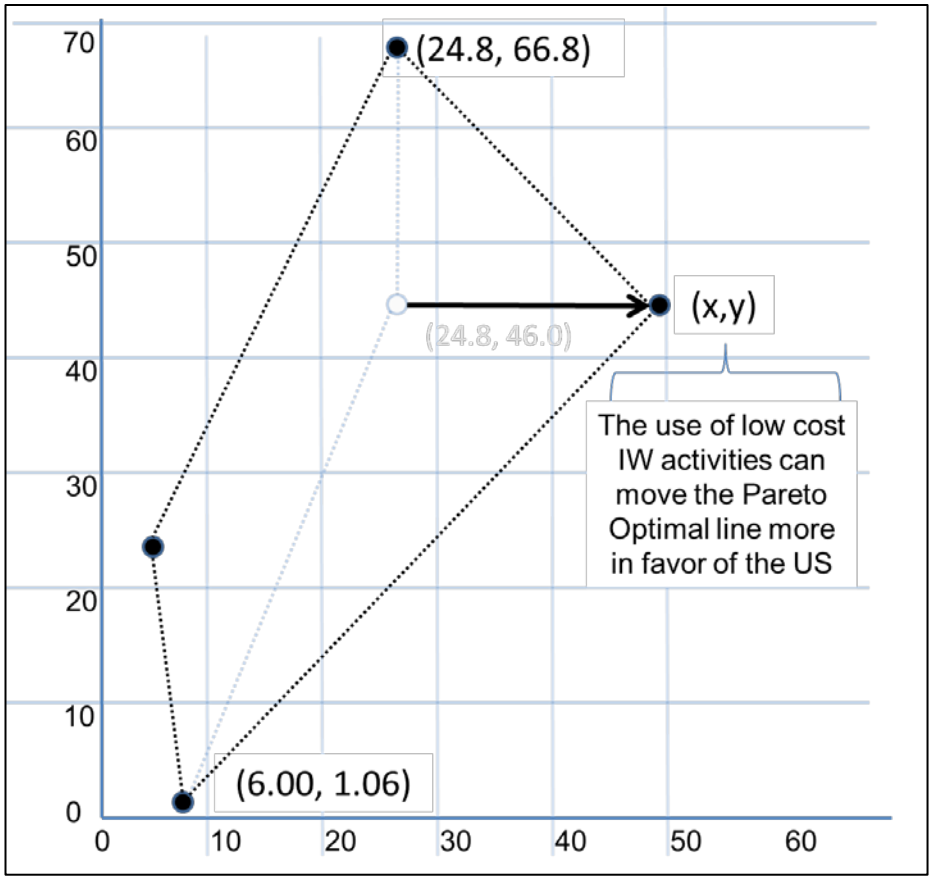

Figure 36. Irregular activities are an excellent way to move the Pareto line in favor of the U.S., with a reciprocal decrease in the PRC position.

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V. CONCLUSION

In the game described in Section Five, the moves are simultaneous, with no communication between the U.S. and China once the moves begin. Real life is rarely like this. Commitments, threats and promises are possible. In this section, I will analyze what possible moves might help or hurt the U.S. in a conflict with China. Translating the pure power game in Section Five into realistic world scenarios is difficult, but not impossible. Rarely do policy makers baldly use strong words like invade, force, victory, and threaten. However, the marriage of game theory and international relations requires it.

Game theory has been expanded over the years to include analysis of strategic moves by the players. During strategic moves, we analyze what might happen if one player moves first, or forces the other player to move first. For example, the most likely place for a demonstration of Chinese strategic power is in the Strait of Taiwan, while a Chinese land war could take place on the Korean peninsula, in Central Asia, or along its southern border, particularly with India.

While the evidence points to China learning how, it could not sustain or secure a large land army beyond its contiguous borders, say in Africa. That could very well change as China invests in a strategic navy. However, as seen in Section Five, the PRC has a dominant advantage in conventional power, while currently the U.S. has an edge in strategic power. Because the China/U.S. conflict is a non-zero-sum game with communication, there are ways to ameliorate the implications of a PRC win. Already the United States has several alliances in place, the effect of which is to increase power available to a U.S.-led coalition. For example, Japan, South Korea and Australia have mutual defense treaties with the U.S. in place. So in the event, the power available to the U.S. is $X + J+A+K$, whereas Chinese power would remain at Y.

This essentially constitutes a first move by the U.S., and increases the cost of the conflict to China. However, U.S. deterrent moves such as signing

defense treaties with neighboring countries and deployments of the U.S. Pacific Fleet could be seen as threatening, precipitating a first move by China. If China were to attack with its nascent force projection power, then currently the U.S. might be able to eke out a victory. Unfortunately, the Chinese leadership and strategic thinkers would also understand Theory of Moves, and power projection by the U.S. over Taiwan could lead the PRC to move into Central Asia, a move which the U.S. could not counter effectively.

Although the U.S. margin of victory in a strategic war is thin, it still provides the best chance for a victory. In any interaction with China, the U.S. would want to engage in a strategic war. The U.S. could threaten China with moves in Central Asia, which in theory could force China to respond with a land campaign to secure its resources there (see Figure 36).

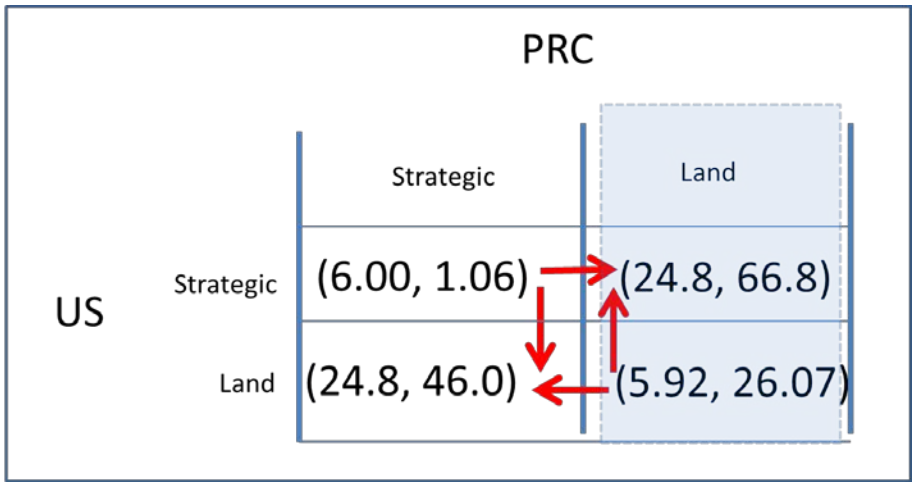

Figure 36. Matrix showing how with threatened land war China responds with land war.

According to the game in Section Five, both countries engaging in a conventional land war predicts the worst outcome for each country. If the threat is believable, and the U.S. launches a land-based task force into central Asia, ala the Manas Transit Center in Kyrgyzstan, then China could very well launch from the west. This would provide an opportunity for the U.S. to maneuver its strategic

forces into the South China Seas in order to secure its own and its allies' resources.

However, the cost of war for the U.S. both in expenditures and possible loss of dominance in the current international system is great. The best option for the U.S. is to force China to spend its revenue not on confronting the U.S. but on expensive demonstrations of power against surrogates. Application of irregular war, such as insurgencies, internal defense, and unconventional warfare along its long southern and western border, as well as in North Korea, could draw the attention away from direct confrontation with the U.S.

Confrontation with China over oil and gas in the South China Sea, or over Taiwan, would be expensive, depending on how we choose to engage. Our game shows that as China grows, the likelihood of a U.S. 'win' grows less so. There is an opportunity to slow Chinese growth by looking to its western borders with Central Asia. Heavy Chinese investment in Central Asia brings with it domestic policies tilted towards China.[228] There is also a fear of heavy Chinese migration following business and tipping the balance of power towards the Han Chinese in the sparsely populated Central Asian nations. There is an opportunity to exploit the ethnic differences between the Chinese and local populations, through which Chinese trucks and pipelines must pass. Far from being viewed as another potential loss of influence to the U.S, this actually weakens the PRC since it increases the number of self-declared 'vital interests' it must defend. The United States must defend its economic interests around the world, and so too would China. Chinese power applied to places like Central Asia and Africa would be a net subtraction from the power available to for conflict in the South China Seas. For every insurgency, there is counter-insurgency (COIN), for every raid, there must be an increase in defense of sites previously considered not militarily valuable. Foreign internal defense (FID) and stability operations (SO) can

228 Edward Wong, "China Quietly Extends Footprints Into Central Asia," *New York Times*, 2 January 2011, online edition.

increase a state's power, and create allies for the United States. This is a clear real-world demonstration of the effect of the Pareto Optimal.

The long timeline for success in irregular war, like the U.S. involvement in El Salvador, Colombia, the Philippines, or East Africa also makes irregular war against China attractive. If Chinese interests can be divided between social stability at home and their interests abroad, there exists a window through which deterrence can succeed.

The CCP is beginning to experience the stress of having to choose between guns and butter. The CCP must continue to attract investment in order to continue the job creation that is the basis of its 'social contract'. While foreign companies are eager to take advantage of cheap labor, the government must fund the massive population shifts from the countryside to the manufacturing cities. The burden of providing healthcare, education, and a clean environment falls on a government that is struggling to provide a minimum of these services.[229] Traditionally, the Chinese have grown old being supported by their children, with large extended families often living together. However, there is now a bulge of older Chinese who suffer from the '4–2–1' problem, in which one child could be expected to support two parents and two grandparents. With rising standards of living and inflation, this is impossible, and so a growing number of elderly Chinese will come to rely on the nascent, but growing, Chinese social security net.[230]

After the revolution, social programs were at the bottom of the CCP's priorities. Even after Mao, the reforms of Deng in the 1970s and 1980s were committed to economic growth. What has suffered has been social spending- on healthcare, education, and safety nets for the elderly. As their population ages, Chinese are demanding new government benefits and entitlements, that the PRC will have to balance with their move towards global power.

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229 Fowler, "China counts the cost", 12-A.12.

230 *The Economist*, "China's Achilles Heel," April 21, 2012.

This thesis concludes that the U.S. has an edge over the Chinese when it comes to weapons of a strategic nature. Sixty years of a robust economy have produced extraordinary gains in technology that have allowed the U.S. many options in war beyond the massed formation and heavy firepower predicated by large land-based armies. However, that advantage is finite. The U.S. economy is unlikely to produce the gains seen in the 1950s and 1960s when the rest of the world was still devastated by the Second World War. Since the fall of Soviet Union in 1991, most of the world's national economies have liberalized, with the effect that industry has moved to new areas with cheap labor and low costs. China has far and away benefitted the most.

China will continue to close the technological gap as it buys advanced technology from around the world, while growing its own domestic R&D abilities. The efficacy of the vast U.S. conventional deterrent is in some doubt because of the immense cost of training and maintaining it. The ability of the U.S. to continue to make only incremental improvements in capabilities at ever-growing costs is also in doubt because of increasing commitments to its social spending.

The results of the game clearly indicate that the U.S. should invest in non-conventional means that can be used to deter China. Diplomacy and irregular war are two sides of the same coin.

DoD has already taken steps to increase the size of SOF, a relatively inexpensive option for irregular war.[231] In the FY 12 Budget, the President has asked for 10.5 billion dollars for USSCOM, with about $3 billion funded with overseas contingency operations (OCO) dollars. Still, in contrast with the U.S. services' $315 billion in Operations & Maintenance and procurement costs, IW capabilities seem cheap by comparison.

A concerted action by the entire U.S. government mechanism in Central Asia would focus Chinese attention there, and away from their military

[231] Andrew Fieckert. " U.S. SOF: Background and Issues for Congress." *Congressional Research Service*. Washington, DC, 15 JUL 2011, 2.

build-up in the South China Sea. It could have the double benefit of shoring up our own interests in the region, turning the nascent countries of Central Asia back to the American fold. In the early Cold War, the Marshall Plan was a foil against the increasing aggressiveness of the Soviet Union, and irregular actions, some successful and some not, helped hasten the collapse of Stalinist-Lenin Communism.[232]

As the U.S. seeks ways to increase its power or reduce Chinese power, it must beware of the status quo point. That is the level of power below which China cannot guarantee its own security. If negotiations and IW move the PRC below this point, China would have no option but to attack in order to secure itself, the classic case of Mearsheimer's offensive realism. The object of the game should be to move China off the Pareto Optimal and its dominant strategy without weakening it to a point below the status quo.

Time is also on the U.S.' side, as China's own demography shifts and becomes more like the US. China has a huge working population, but it is aging. The working population can easily support dependent children and elderly parents.[233] Compare that to America which currently has 13% of the population over 65. By 2050, the China's percentage will be 26%, higher than the U.S.[234] with only 22 percent working. The CCP has experimented with loosening the one

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[232] There have been several waves of revisionist thinking on the Cold War and the eventual fall of the Soviet Union, beginning with William Williams who claimed it was not the U.S.SR expansion into Eastern Europe and refusal to leave which led to hostilities, but the demands of the U.S.A to have 'open doors' around the world (see *Tragedy of American Diplomacy*, Norton, New York,1988). For the purpose of this thesis, the United States did take actions, and the U.S.SR did fall. The most significant Cold War historian is John Lewis Gaddis, *The United States and the Origins of the Cold War 1941–1947*, Columbia University Press, New York, 1972. See also John Lewis Gaddis, "The Emerging Post-Revisionist Synthesis on the Origins of the Cold War," *Diplomatic History,* Vol. 7, No. 3 (Summer 1983), pp.. 171–190 and John Lewis Gaddis, *We Now Know: Rethinking Cold War History* (Oxford: Clarendon Press, 1997). For newer treatments Using old Soviet archives opened after 1991, see Kathleen Burk, "The Marshall Plan: Filling in Some of the Blanks," *Contemporary European History,* Vol. 10, No. 2 (July 2001), pp.. 267–294, and Diane B. Kunz, "The Marshall Plan Reconsidered: A Complex of Motives," in Peter Grose, ed., *The Marshall Plan and Its Legacy* (New York: Council on Foreign Relations, 1997), p. 13, and Eduard Mark, "The War Scare of 1946 and Its Consequences," *Diplomatic History,* Vol. 21, No. 3 (July 1997), pp.. 383–415.

[233] Naughton, *Transitions and Growth,* 2006.

[234] *Economist*, "China's Achilles Heel," April 21, 2012.

child policy, which would ease the demographic problem. Other countries like Japan and Korea have grappled with the strain of an aging population, too. It will be harder in China, however, because, as Barry Naughton observes, "China will grow old before it has had the opportunity to grow rich."[235]

A. FUTURE RESEARCH

This thesis provides a jumping off point for future research. While the hypothesis and conclusions are intriguing, the model should be validated. This can be done by substituting the values for national powers into the model for other states that have had observable transitions in the past. The COW researchers have provided reliable data on which to base those computations all way back to 1815. Early in Section One, I provided a figure which showed transitions, both as a result of war and peaceful transitions. The equations for determining national power used in Section Five should also predict the winner in those conflicts. This ability to reproduce similar results in other conflicts is very important to the *validation* of the model.[236]

A study could also be done in which the capabilities of irregular forces around the world are catalogued and indexed. This would provide important data from which the relative strengths of irregular forces could be determined much like the power values derived in Section Five. This would also serve an important validation function in the model.

235 Naughton, *Transitions and Growth*, 2006.

236 Washburn, *Combat Modeling*. 2009.

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